Alberta Timber Harvest Planning and Operating Ground Rules Framework for Renewal

Alberta Sustainable Resource Development
Public Lands and Forests Division
Forest Management Branch
June 2005

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Alberta Timber Harvest Planning and Operating Ground Rules Framework for Renewal

1.0 GROUND RULE SCOPE

Ground rules are the practices used in planning and conducting timber harvesting operations which constitute the methods used to implement decisions made in the FMP and other higher level plans such as Integrated Resource Plans (IRP). In the event that these strategic plans do not exist, the ground rules shall establish practices that minimize the chance of negative impacts from roads, timber harvesting and forest management operations and activities. Authorizations by Alberta do not imply authorization under federal legislation and requirements, notably the federal Fisheries Act and Migratory Birds Convention Act. The proponent must seek advice and approvals of the federal agencies (Department of Fisheries and Oceans, Environment Canada) regarding federal legislation requirements.

1.1 REGULAR REVIEWS

The intent is to have an annual review of ground rules if requested by either forest disposition holders or Alberta. This is not meant to be a complete redevelopment but rather an opportunity to fine-tune the ground rules. It is expected that regular reviews will allow participants to plan revisions more systematically and to correct any inconsistencies or problems. It will also create the ability to regularly consider modifications that reflect the best and most current knowledge and tools available.

2.0 THE TOPICS

This annex provides a list of topics that must be addressed in all ground rules. Each topic includes a purpose, discussion, and ground rule heading. All ground rules shall be written following this format. Bolded text is mandatory and would only be changed if, in Alberta's opinion, the result is a higher standard of practice. Non-bolded text may be modified where in Alberta's opinion it doesn't apply to an area, or the issue is handled differently to meet local needs while still meeting Alberta's expectations.

PURPOSE

A statement of what the topic is designed to accomplish.

DISCUSSION

Include background information, research knowledge, and reasons for the concern. The discussion shall focus on why a ground rule is needed. Alternative actions or solutions could also be discussed here.

GROUND RULES

These are definitive statements of the desired results to be achieved and a clear indication of what is expected. **The ground rules shall be relevant, measurable, understandable and achievable.**

3.0 OPERATIONAL PLANNING

3.1 PLANNING PROCESS

PURPOSE

The operational planning process is designed to expedite the implementation of the FMP. Where management direction has not been established through an approved FMP, then required decisions shall be made during this operational planning process.

DISCUSSION

The planning process includes five main components:

1. Approved Forest Management Plan (FMP)
   - **Spatial Harvest Sequence (SHS) for first two 10-year periods**
   - **Approved Long Term Road Network**

2. Compartment Assessment (CA) – **A CA shall be required when information or major issues are identified that in Alberta's opinion, have not been addressed in the FMP. In the event that the SHS is deemed by Alberta to be inappropriate due to a significant change in circumstances since the approval of the FMP, a compartment assessment describing current issues, shall be required. (see section 3.2)**

3. General Development Plan (GDP) **The GDP gives a comprehensive description of a forest operator's proposed harvest strategy, road building plans, and reclamation operations for a five -year period, and includes all licences and permits. The GDP is used to guide integration of activities. (see section 3.3)**

4. Final Harvest Plan (FHP) – **The FHP is a map and associated report describing the laid out harvest plan. (see section 3.4)**

5. Annual Operating Plan (AOP) – **The AOP describes operations in detail through a series of components that shall be submitted together at the same time, or as individual submissions on a schedule approved by Alberta:**
   a) **Operating Schedule and Timber Production**
   b) **Applicable Final Harvest Plans**
   c) **General Development Plan**
   d) **Compartment Assessments as required**
   e) **Reforestation Program**
   f) **Fire Control Plan**
   g) **Road Plan**

   (see section 3.5)

3.2 COMPARTMENT ASSESSMENT (CA)

PURPOSE

To address significant issues that have arisen since the approval of the FMP.

DISCUSSION

It is recognized that circumstances change over time and it is possible that the SHS approved in the FMP may prove to be inappropriate. Where Alberta deems it necessary, a CA shall be completed to adjust the operational plan for the area. CAs are necessary when major new issues or information that have been identified since FMP approval make the SHS inappropriate. (e.g., Forest fire, insect or disease, species of special management concern, a major change in land use direction or an unacceptable variance of >20% of the SHS/compartment/ decade as determined by the Area Manager and the manager of FMB) The CA shall describe how the new issues will be incorporated into the FHP. In completing the CA, operators must consult in a meaningful way with stakeholders and strive to reach general agreement on issues. The CA provides an opportunity to reconsider management strategies at the time of operational planning if warranted.

GROUND RULES

3.2.1 Alberta shall decide on the boundaries of the area on which a CA is required after consultation with the forest disposition holder.

3.2.2 If a CA is required, the operator must receive Alberta's approval for the CA prior to the submission of a FHP.

3.2.3 A CA is considered current if it has been approved by Alberta and the FHP is submitted to Alberta within three years of approval.

3.2.4 The CA shall include any maps, analyses, and reports deemed necessary by Alberta to adequately address the issues.

3.3 GENERAL DEVELOPMENT PLAN (GDP)

PURPOSE

To provide a projection of activities for the next five years to:
a) Guide the integration of activities
b) Schedule timber disposition administration activities;
c) Predict cut control status;
d) Co-ordinate the development and reclamation of roads.

DISCUSSION

The primary components of the GDP include a forecast of the areas scheduled for harvest for a five year period and a summary of variance from the SHS for existing FHPs or long-term road plans outlined in the FMP. The GDP must also include the current status and forecast of the respective AACs and cut control period for each of the operators within the planning area. This could be either a joint submission by all operators or separate submissions containing consistent information between operators.

In addition to outlining the projected wood supply forecast, the GDP shall also include details regarding road requirements, and fish and wildlife issues within the planning area. It is expected that there will be substantial discussion on significant issues with Alberta before the FHP is submitted.

GROUND RULES

3.3.1 The GDP submission date is May 1 of each year unless otherwise approved by Alberta. Alberta shall respond within 30 days. The GDP shall be approved subject to an appraisal by Alberta.

3.3.2 The GDP shall contain a summary of any proposed variances from the harvest sequence and long-term road plan in the FMP. Variances must be approved by Alberta. (see section 4.1.1)

3.3.3 The GDP shall describe volume supply by area, road standards and construction schedule, and reclamation activities. The plan is a notification to Alberta of proposed activities and exceptions (see 3.3.2) to guide future regulatory ac tivities. Other forest operators affected by the GDP must agree in writing to the GDP before it will be approved. It is expected that there will be substantial discussion to resolve significant issues with Alberta before the FHP is submitted. Proposed over-cuts shall not be approved. (See section 5.1.1)

3.3.4 When a major change in a company's general development strategy is proposed after the GDP is received, a revision may be requested by Alberta where the change may affect issuance of dispositions, the orderly review of AOPs, r integration with other forest operators. o

3.3.5 The GDP consists of the following:

1. Schedules with the following information:
   - a) the areas to be harvested each year of the next five-year period;
   - b) timber production summary table for all dispositions (by year);
   - c) Class I, II and III road developments showing planning and construction time lines and the status of LOC applications;
   - d) all roads noted that are to be monitored, and all outstanding and anticipated reclamation work related to LOC road and stream crossings;
   - e) a brief description of potential issues arising from the proposed harvest activities that have been identified through discussions with Alberta or other known resource users;
   - f) proposed and actual volumes in satellite yards; and
   - g) a description of variances (as per 3.3.2) from the SHS and FMP long-term corridor plan supported by appropriate documentation.

2. A map (of appropriate scale) that shows the following:
   - a) the mill site location;
   - b) proposed haul routes (differentiating existing roads from roads to be constructed) and primary routes to be used for reforestation access;
   - c) satellite yard locations
   - d) the timber dispositions to be operated;
   - e) other important forest resource areas or facilities that could be directly affected by logging; and
   - f) the general location of routes, dispositions and facilities where reclamation work is scheduled and where roads and watercourse crossings are reclaimed.

3.4 FINAL HARVEST PLAN

PURPOSE: To describe the laid out harvest and road design

DISCUSSION

The primary components of a Final Harvest Plan (FHP) are a map and report that clearly show and document the harvest area boundaries, roads and water crossings for the compartment. The design shall be valid for five years from the time of approval, unless issues deemed significant by Alberta arise during this period.

GROUND RULES

3.4.1 A FHP shall be approved by acceptance if:

- **a) validated by a RFP;**
- **b) deletes less than 20% of the area sequenced in the SHS/Strata description table (SDT), by compartment per decade;**
- **c) the harvest area (ha) does not exceed 100% of the total area in the SHS or strata description table by compartment per decade as tracked in the GDP, and**
- **d) it adheres to all ground rules.**

Where the FHP does not meet one or more of the above standards, the FHP shall undergo a full review by Alberta. Variances from the SHS shall be reported annually in the FHP in a format acceptable to Alberta. (See section 4.1.1)

3.4.2 If a CA was completed, the FHP shall undergo a full Alberta referral and review to ensure the direction in the CA has been implemented.

3.4.3 All FHPs submitted by operators who harvest more than 30,000 m^3 each year from crown land, must be validated by a RFP. Validation means that, the OGRs were followed, the SHS was followed or variances identified, and all affected operators have agreed to the design. (See section 5.1.1)

3.4.4 Other forest operators affected by the FHP must agree, in writing, with the FHP before it will be approved. (see section 5.1.1)

3.4.5 Maps shall accurately show the following information:

- **a) The approved forest inventory**
- **b) Approved SHS and variances from the SHS.**
- **c) All laid out Class 1 – 3 roads within harvest areas and harvest area boundaries for all timber operators,**
- **d) All proposed Class 4 roads within harvest areas**
- **e) Current dispositions and reserves, e.g., Registered Trapline boundaries, permanent sample plot locations.**
- **f) Watercourses, their classifications and protective buffers**
- **g) Springs, water source and seepage areas**
- **h) Road corridors and LOC numbers and classes for both existing and proposed roads. Locations of access control measures**
- **i) Planned watercourse crossing locations and watercourse crossing structure types**
- **j) Current information on previously harvested areas, existing trails, seismic lines, power lines, pipelines and access routes**

k) Sensitive wildlife sites as per section 7.7.5.2

3.4.6 In addition to the FHP map, the following information is required:

a) Area (ha), and coniferous and deciduous volume for each proposed harvest area
b) SHS map with an overlay of laid-out harvest areas depicting all variances from the SHS.
c) Summary table of variances from the SHS by harvest area for each FHP, (see section 4.1.1)
d) Reforestation strata designation for each harvest area
e) Dispositions
f) Description of how the CA is addressed in the FHP
g) List of watercourse crossing location and watercourse crossing structure types
h) Access control methods employed
i) Table showing status of non-LOC roads (see section 11.2.3.2)
j) Description of integration with other users (see section 5.1.1)

3.4.7 Road design and location shall be described for all roads joining harvest areas, and LOC roads to be constructed for extraction of timber from all proposed harvest areas, if not identified in the phased road planning process or the FMP's long term road development plan by the forest operator. These road comments include the following:

a) Road design, classification, season of use
b) Choice of corridor location and width
c) Considerations made for other road users
d) Considerations made for non-timber resources
e) Rationale for choice of stream crossing location, choice of crossing structure, and design information
f) Integration of existing roads into the design

3.4.8 Where applicable the following comments shall be described for each harvest area:

a) Harvest area comments shall be included on the harvest area form that depicts the laid-out harvest area boundary and road.
b) Layout bordering and encompassing riparian management zones when different than the standards in section 6.0
c) Layout bordering non-merchantable and inoperable timber types
d) Layout bordering restricted areas, e.g., permanent sample plots (PSPs), private land)
e) Identification of understorey (see section 7.5)
f) Harvest area-specific structure retention and woody debris management strategies
g) Tactics to address forest health issues
h) Protection of roadside vegetation - applicable or not, and how to be done
i) strategies to address sight distance concerns with an attempt to maintain sight distance of 400m or less.
j) Need for a detailed harvest area plan (see section 3.4.10)
k) Important wildlife sites as defined in section 7.7.6.2 (this information shall be made available for resource planning purposes only through Fish and Wildlife)
l) Historical site considerations
m) Soil protection measures for unfrozen ground timber operations

3.4.9 Changes meeting the following criteria require only RFP validation and notification but don't require Alberta's approval (these changes can be implemented prior to

notification but must be reported no later than one week after implementation). Changes exceeding the following criteria require Alberta's approval.

a) Harvest area boundary changes where the final area by harvest area does not vary from the area in the FHP by more than five percent.

b) Road location changes by up to two ROW widths from location in FHP. ROW is considered to be the maximum ROW allowed in Table 3 for the class of road proposed.

c) Changes shall not adversely affect buffers established for the protection of riparian areas, wildlife sites, historical resources, or aesthetic values.

3.4.10 Detailed harvest area plans (DHAP) are required when there is higher than average potential for environmental damage. Circumstances that merit DHAPs are:

a) areas of steep topography requiring specific road location and construction or specialized harvesting equipment.

b) unstable slopes are generally to be avoided but if this is not possible it is necessary to plan operations carefully to minimize impacts.

c) harvest areas with numerous water source areas, seepages, intermittent, or ephemeral watercourses.

d) harvest areas that contain sensitive wildlife areas

e) harvest areas requiring understorey protection using protection techniques, (see section 7.5)

f) harvest areas located near high-value recreation areas, tourism areas, and facilities.

g) partial harvests, excluding commercial thinning (CT) and pre-commercial thinning (PCT).

h) when harvesting is used as a tool to control insects and disease infestations.

i) planned harvest areas exceeding maximum block sizes as defined in section 7.2, or harvest areas exceeding 100ha in the SHS.

The DHAP shall include a map of appropriate scale to the issue(s) and describe how the concern will be addressed in operations. DHAPs are not submitted to Alberta but must be available upon request.

3.5 ANNUAL OPERATING PLAN

PURPOSE

To annually authorize all road, harvest and forest management activities for the operator.

DISCUSSION

The AOP articulates in detail the activities proposed for the current year and must be approved by Alberta before timber operations shall commence. The AOP components include:

a) Operating Schedule and Timber Production
b) Applicable Final Harvest Plans
c) Compartment Assessments (if applicable)
d) Reforestation Program
e) Fire Control Plan
f) Road Plan
g) General Development Plan

Refer to Appendix 1 of Annex 4 for RFP validation requirements

For timber permit operators and small quota holders who harvest less than 30,000 m^3 annually, Alberta has alternate AOP submission requirements.[1]

GROUND RULES

3.5.1 The AOP submission date is May 1 of each year unless otherwise approved by Alberta. Alberta shall respond within 30 days. The AOP shall be reviewed by Alberta with approval subject to the outcome of the review.

3.5.2 The Operating Schedule and Timber Production, Reforestation Program, Fire Control Plan, and Road Plan, are submitted as in 3.5.1 above, unless otherwise agreed to by Alberta. The schedule for submitting any necessary CA, GDP and FHPs may be different.

3.5.3 Only harvest areas and roads with FHP approval shall be scheduled for operations in the AOP submission.

3.5.4 The Annual Operating Plan shall contain the following components:

a) The map(s) referred to in 3.4.5 above

b) Administrative and Timber Production Information:

I. Name of disposition holder(s)
II. Number of the disposition(s)
III. Date of submission and effective period
IV. Location of mill where timber will be manufactured or processed, unless alternative reporting has been approved
V. Where all volumes (deciduous and coniferous) will be charged (Quota, deciduous timber allocation, FMA, Commercial Timber Permit).
VI. Proposed harvest volume to be harvested by timber disposition.
VII. Community Timber Program Operators shall include all road use agreements

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[1] TM118 form

VIII. **Scaling methodology, e.g., weigh scale, other arrangements, (not necessary if otherwise submitted)**

IX. **Utilization standards**

X. **Declaration or list of land use notifications, and Date of Notification See Sec 5.0**

c) **Operating Schedule – a table which outlines:**

I. **List of harvest areas proposed for harvest (including area and volume by species or species group, with totals)**

II. **Lists of roads proposed for construction, maintenance and reclamation for non-LOC roads, except in-harvest area roads. It includes watercourse crossings to be built or installed or removed/maintained.**

III. **Declaration of outstanding operational items, or an agreement with Alberta on reporting of outstanding operational items**

IV. **Debris disposal**

d) **Annual Reforestation Program (see section 8.2)**

e) **Fire Control Plan which covers suppression equipment (see section 10.3 Fire Management, ground rule 10.3.3)**

f) **Road Plan (see section 11.2)**

g) **GDP and CA if applicable**

3.6 SALVAGE PLANNING

PURPOSE

Salvage planning shall be implemented when necessary to reduce the potential for loss of fibre.

DISCUSSION

Under certain circumstances, planning shall be expedited to reduce the loss of fibre from fire, disease or insect infestation; blowdown or other such unforeseen disturbances.

Salvage planning shall not be used when:

a) The disturbance regime is slow moving and can be accommodated under conventional planning timeframes and protocols.

b) The regime is not an imminent threat to green fibre.

c) Fibre loss is deemed to be within an acceptable range.

Salvage planning does not confer rights to the planner to ignore other values, or the inherent value of a natural disturbance. It does allow for consideration of all values and for prompt, qualified, professional opinion to drive the process.

GROUND RULES

3.6.1 Salvage planning is initiated on the natural disturbance when deemed appropriate by Alberta.

3.6.2 A FHP for the salvage area must be developed, and shall form part of the AOP. Modified timelines and content for the FHP shall be considered by Alberta. Detailed requirements may be published from time to time by Alberta. It is expected that there will be substantial discussion to resolve significant issues with Alberta before the FHP is submitted.

4.0 UTILIZATION

4.1 STAND UTILIZATION

PURPOSE

To define merchantability specifications for stands and to determine which stands will be included in the planning process. The planned and harvested timber profile shall be the same.

DISCUSSION

The scheduling of stands is dependent upon the merchantability criteria outlined in the disposition holder's tenure document (i.e., FMA or Quota certificate.) and the assumptions used in the timber supply analysis for the area. Pertinent assumptions are comprised of deletions from the net landbase (e.g., subjective deletions, stream buffers, protected areas) and parameters that limit the availability of stands for harvest scheduling (e.g., earliest age of harvest, green-up limits). The SHS is the result of the interaction of these combined assumptions and defines the stands to be harvested by period required to produce the sustainable harvest level. The assumptions in the TSA are reflected in the SHS and although it would be ideal to follow the SHS exactly, common sense dictates that some variance is unavoidable. The intent of this topic is to provide guidance on how to address variance from the SHS.

GROUND RULES

4.1.1 Variances from the SHS shall be categorized and reported as follows:

Variance from the SHS shall be tracked and reported by compartment. The cumulative total variance for all FHPs will be reported for compartments with more than one FHP and tracked in the GDP. Variances shall be identified as either permanent deletions from the net landbase, or deferrals to a later time, and, organized as follows:

a) Deleted from net landbase

b) Deferred from net landbase

4.1.2 Variances (areas and percentages) from the SHS shall be reported annually in a format acceptable to Alberta. (See Annex 1, section 6.7)

4.2 TREE UTILIZATION

PURPOSE

To utilize all merchantable trees and pieces in a merchantable stand as defined by the timber disposition and the FMP.

DISCUSSION

Tree utilization assumptions in the FMP must be followed so that sustainability is not affected.

GROUND RULES

4.2.1 The tree/piece utilization standards is stated in the applicable timber disposition and shall normally be one of the following standards.

Coniferous Utilization Standards
15/10 Utilization

- **Merchantable Tree: one that has a minimum diameter of 15 cm outside bark at stump height (30 cm) and a usable length of 4.88 m to a 10 cm diameter (inside bark).**
- **Merchantable Piece: one that is 2.44 m (plus 5 cm trim allowance) or longer, with a 10 cm (inside bark) small end, where rot content or form does not render it unusable.**

15/11 Utilization

- **Merchantable Tree: one that has a minimum diameter of 15 cm outside bark at stump height (30 cm) and a usable length of 4.88 m to a 11 cm top diameter (inside bark).**
- **Merchantable Piece: one that is 2.44 m (plus 5 cm trim allowance) or longer, with an 11 cm(inside bark) small end, where rot content or form does not render it unusable.**

13/7 Utilization

- **Merchantable Tree: one that has a minimum diameter of 13 cm outside bark at stump height (30 cm) and a usable length of 4.88 m to a 7 cm top diameter (inside bark).**
- **Merchantable Piece: one that is 2.44 m (plus 5 cm trim allowance) or longer, with a 7 cm (inside bark) small end, where rot content or form does not render it unusable.**

Deciduous Utilization Standards
15/10 Utilization

- **Merchantable Tree: one that has a minimum stump diameter of 15 cm outside bark and a merchantable length of 4.88 m or greater to a 10 cm top diameter (inside bark), or to the point where the stem is unusable or there is no central stem due to heavy branching.**
- **Merchantable Piece: one that is 2.44 m or longer to a 10 cm (inside bark) small end, where rot content or form does not render it unusable.**

Salvage Operations
19/13 Utilization

- **This standard may be adopted by Alberta to encourage recovery of timber damaged by fire or insects and diseases in coniferous and deciduous stands.**
- **Merchantable Tree: one with a minimum diameter of 19 cm outside bark at stump height (30 cm) and a merchantable length of 5.0 m or greater to a 13 cm top diameter (inside bark).**
- **Merchantable Piece: one that is 2.44 m (plus 5 cm trim allowance) or longer, to a 13 cm (inside bark) small end, where rot content or form does not render it unusable.**

4.2.2 Coniferous and deciduous log butts or large ends exhibiting advanced decay greater than 50% in area of the cut surface (basal area) may be bucked at 0.61 m intervals or less to 50% sound wood.

4.2.3 Maximum stump height when measured from ground level shall be no more than 30 cm or that used in the timber supply analysis for the FMP (e.g., 15 cm.). Exceptions may be approved in the FHP. (e.g. to delineate harvest areas, create rub posts for understory protection)

4.2.4 As per the Debris Management and Structure Retention ground rules, forest operators are permitted to leave merchantable volume in harvest areas if the approved FMP identifies specific stand structure retention strategies. In the absence of FMP guidance, the standards in section 7.4 of this annex apply.

4.2.5 All trees/pieces used in the construction of crossing structures may be scattered or piled along the right-of-way or in the harvest area, but they shall not be piled in riparian areas.

5.0 INTEGRATION WITH OTHER USERS

5.1 DECIDUOUS/CONIFEROUS INTEGRATION

PURPOSE

To ensure that planning, harvesting and reforestation in overlapping dispositions are carried out efficiently and with a minimum of environmental impact.

DISCUSSION

Due to overlapping tenures, integration of activities between the various operators is essential. Alberta monitors the integration of roads and harvesting, but the responsibility for co-ordinating plans and operations lies with the operators.
Integration of activities is necessary to:

a) Reduce the amount of time roads are open
b) Reduce disturbance of wildlife
c) Enable prompt reforestation

GROUND RULES

5.1.1 All operators with timber dispositions in an area covered by a FHP/GDP must agree to the FHP and GDP before approval is granted. If agreement cannot be reached after all meaningful consultation has taken place, the following dispute resolution process can be implemented. Areas of disagreement will be documented and forwarded to the SRD Senior Forester for review with the reviewing forester. Depending on the exact nature of the disagreement, SRD will either: 1) facilitate a dispute resolution process, or 2) direct the operators on areas of disagreement through conditions of approval. If either proponent disagrees with the determination of the Senior Forester, they may appeal the decision to the Area Manager.

5.1.2 All roading, harvesting and silviculture operations shall be completed at a time and in a manner that enables effective reforestation and minimizes road access.

5.2 FOREST RECREATION AND TOURISM

PURPOSE

To manage the implications of forest management activities on forest recreation.

DISCUSSION

Forest management activities can impact recreational opportunities. Potential exists for increased public awareness and for increased recreational opportunities through co-ordination with forest management practices. The FMP shall have addressed recreational issues through a variety of tactics such as deferrals or buffers around specific sites or access management strategies.

GROUND RULES

5.2.1 Operational tactics to mitigate impacts on recreation and tourism shall be described in the GDP and FHP.

5.2.2 The forest operator shall work with groups that have raised concerns with the operator or have been identified by Alberta.

5.2.3 Roads should be planned to avoid recreation sites. Roads shall be designed to ensure they can be used safely while minimizing their impact on the recreation values of the area.

5.2.4 FHPs affecting recreational sites shall provide opportunities for the enhancement of existing recreational trail and road systems whenever possible, while adhering to the provincial Motorized Access Management Policy on Industrial Dispositions.

5.3 TRAPPING

PURPOSE

To avoid damage to the infrastructure associated with Registered Fur Management Areas (RFMA) and to reduce the impact on trapping opportunities.

DISCUSSION

Communication with the owner and/or operator of a trapline is a key element in minimizing the impact of timber operations. Discussions held early in the planning process allow both the trapper and the forest operator to work co-operatively, with the least amount of disruption to their individual operations.

GROUND RULES

5.3.1 To facilitate communication between forest operators and trappers, Fish and Wildlife shall annually update the list of RFMAs and owners. Upon request the local Fish and Wildlife office shall provide the relevant list of trappers to the forest operators before January 1 of each year.

5.3.2 A representative of the forest operator shall personally contact, or send a registered letter to the senior partners of a RFMA during the preparation of the FHP. Information such as cabin locations, trails and other improvements, or concerns shall be noted at this stage. During the development of the FHP information and concerns shall be integrated into the plan. The forest operator shall provide the trapper with a copy of the approved FHP map.

5.3.3 At least ten days prior to commencing operations, the forest operator shall notify the trapper, preferably by personal contact, that timber operations are beginning in the RFMA.

5.4 RANGE MANAGEMENT

PURPOSE

To integrate forest and range management operations.

DISCUSSION

The goal is to develop a co-operative, long-term relationship between grazing disposition holders and forest operators to sustain fibre and forage resources.

At the GDP, FHP and AOP stages of planning, the emphasis is to integrate harvesting, silviculture, and grazing schedules to ensure the sustainability of timber, forage, wildlife and watershed values (i.e., wildlife habitat, watershed protection). Specific harvesting and reforestation operations and grazing systems would be identified within components of the AOP.

Effective communication between the timber and grazing operators is necessary. Discussions held early in the planning process are intended to enable the grazing disposition holder and the forest operator to work co-operatively minimizing the disruption to their individual operations. Alberta is currently developing standards to guide the integration of timber and grazing. Once these standards are approved, they will be incorporated into the ground rules.

GROUND RULES

5.4.1 The forest operator has consulted with the grazing disposition holder within the FHP boundary, to address specific concerns during the development of the FHP. The FHP includes a description of strategies to:

- protect range improvements, infrastructure,
- mitigate effects to natural fence barriers,
- mitigate impacts to forage productivity and availability, and
- communicate during and after timber operations.

5.4.2 The forest operator has ensured that timber operations do not negatively impact the range management of the grazing disposition. Examples of these impacts include: damage or disruption to , range improvements, infrastructure, roads, and bridges (eg. Fencing, water developments) The forest operator is responsible to repair and/or replace any damage to these improvements and infrastructure.

5.4.3 The forest operator has contacted the grazing disposition holder in person or by phone a minimum of 10 days prior to commencing timber operations to discuss access and any other issues affecting the range management of the grazing disposition.

5.5 FOREST AESTHETICS

PURPOSE

To manage the visual impact of timber operations on the forest landscape.

DISCUSSION

The objective is to mitigate the impact of timber operations on the visual quality of the forest landscape by:

- Identifying the location of forest landscapes and other areas of high visual and scenic value, and setting objectives for their management;

- Addressing visual quality issues in the FMP.

Areas considered highly sensitive are those:

a) Within, adjacent to or viewed from recreational sites and tourist developments;
b) Seen from elevated viewpoints;
c) Adjacent to or viewed from major travel corridors (roads, lakes and rivers), rural/urban forest interface and site-specific areas identified during the referral and public review process;
d) Adjacent to primary and secondary highways in Alberta.

Tactics to reduce the impacts of timber harvest and reforestation on visual quality may include: retention of forest structure and lesser vegetation at strategic vantage points in the harvest area, modification of harvest area design, low impact scarification techniques, vegetative buffers, and utilizing natural topography.

GROUND RULE

5.5.1 Highly Sensitive areas shall be assessed and tactics shall be employed in the FHP to mitigate the impacts of harvesting and reforestation on visual quality.

5.6 HISTORICAL RESOURCES

PURPOSE

To ensure that forest operators identify and protect historical and cultural resources.

DISCUSSION

There are many thousands of historical resources (e.g. archaeological and palaeontological sites),, located on Alberta's Crown land. In keeping with the requirements of Alberta Community Development, forest operators shall develop and implement a process for identifying and protecting resources that are regulated by the Historical Resources Act.

GROUND RULES

5.6.1 All known historical resources, and lands on which they are likely to occur shall be identified and managed in keeping with the requirements of Alberta Community Development..

5.6.2 Historical resource records are confidential and shall not be shared with the public.

5.6.3 If a previously unknown historical resource is discovered during road building, harvesting, or silviculture operations, the operations that may directly affect the historical resource shall cease and the Heritage Resource Management Branch of Alberta Community Development shall be notified.

6.0 WATERSHED PROTECTION

PURPOSE
To manage the implications of timber operations on water quality, quantity, and flow regime by:

- minimizing the potential for sedimentation in watercourses
- preventing soil, logging debris and deleterious substances from entering watercourses
- maintaining aquatic and terrestrial habitat
- complying with the Water Act.

DISCUSSION

The FMP shall address watershed water quantity and flow issues. Ground rules define operating practices to protect water quality and riparian values.

Riparian areas adjacent to watercourses and water source areas perform a number of ecological functions. Riparian areas help to regulate stream flows (storage and release of surface and groundwater), reduce sheet, rill and gully erosion, and moderate stream temperature. Functional riparian areas , provide bank stability, debris for creating aquatic habitats and provide a source of food and nutrients for aquatic organisms. Riparian areas also provide habitats supporting a high diversity of wildlife species and other terrestrial biota, and provide corridors that can link different landscape and habitat features.

Authorizations by Alberta do not imply authorization under federal legislation and requirements, notably the federal Fisheries Act. The proponent must seek advice and approvals of the federal agencies (Department of Fisheries and Oceans) regarding federal legislation requirements.

GROUND RULES

6.0.1 Watercourses shall be classified according to Table 1, Watercourse Classification. In the event the channel classification is not distinctly evident, the width shall be determined by the average of measurements taken at 50m intervals at representative points of undisturbed stream channel over the length of the watercourse bordering the block.

- **A minimum of four measurements are required with the measurement location flagged for audit purposes.**
- **The channel width is measured from where the bank begins to slope down towards the channel bottom across to the same point on the opposite bank.**
- **Where the distance bordering the block is not enough for four measurements, reduce the measurement interval as required.**

6.0.2 Where an approved FMP does not provide an estimate of increased water yield, the following applies. Watersheds shall not be unduly affected by large harvest areas or harvesting large amounts of timber in a watershed unless otherwise approved in the FMP. Predicted average annual water yield increases should not exceed 15% within third-order streams. Companies will report the increase in water yield annually in a mutually agreeable format.

6.0.3 Measures must be implemented, including temporary and permanent erosion control measures, to minimize erosion and sedimentation into the watercourse or waterbody.

6.0.4 Riparian protection areas shall be established as in Table 2, Standards and Guidelines for Operating beside Watercourses. Where uncertainty exists on the classification of the watercourse, the watercourse protection area shall be that required by the higher class of watercourse.

6.0.5 **All unmapped or incorrectly classified watercourses encountered during operations shall be given the appropriate protection as described in Table 2.**

6.0.6 **Unless otherwise approved in a FMP variances from the standards in Table 2, must demonstrate that aquatic and terrestrial objectives are met. Any such proposals shall undergo a full review by Alberta prior to being considered for approval.**

6.0.7 **Sediment, logging debris or deleterious materials (e.g., fuels, oils, greases, industrial or household chemicals or refuse) shall not be deposited into the water or onto the ice of any watercourse or water body during road construction, maintenance, harvesting, reclamation or silviculture operations.**

6.0.8 **Equipment shall cross watercourses only at approved crossings.**

6.0.9 **Logs shall not be decked in watercourses, riparian areas, or seepage areas.**

6.0.10 **Authorized in-stream activities in fish-bearing watercourses shall be scheduled to avoid disturbing migration, spawning and incubation of fish species, and carried out in such a manner as to avoid stream sedimentation.**

6.0.11 **Beaver ponds shall have same classification as the watercourse flowing out of the pond as measured at the smallest width within 50m of the dam.**

6.0.12 **Harvesting is not permitted within water source areas during non-frozen periods.**

Table 1. Watercourse Classification

Watercourse Classification					Fisheries/Wildlife Values	Potential Impacts
Type	**Mapping Designation**	**Physical Description**	**Portion of Year Water Flows**	**Channel Development**		
Class "A" Waterbodies	Solid Red Line on Watercourse Crossing Codes of Practice (Water Act)	Not applicable	Not applicable	Not applicable	Known habitats critical to the continued viability of locally or regionally important fish species; Habitat areas are sensitive enough to be damaged by any type of in-stream activity or changes to water quality or flow regime	Fish and fish habitat affected by sediment load, turbidity, disposition of sediment, chemical contamination or alteration of stream flow
Class "B" Waterbodies	Solid (Variable Colour) lines overlain by small circles on Watercourse Crossing Codes of Practice (Water Act)	Not applicable	Not applicable	Not applicable	Key broadly distributed habitat areas important to the continued viability of a population of locally or regionally important fish species; Habitat areas are sensitive enough to be potentially damaged by in-stream activities; Potential short and long-term effects of in-stream activities considered to have detrimental effects on, and are high risk to, the survival of fish populations	Fish and fish habitat affected oy sediment load, turbidity, disposition of sediment, chemical contamination or alteration of stream flow
Large Permanent	Solid heavy line or double line	Major streams or rivers; Well-defined flood plains; Often wide valley bottoms	All year	Non-vegetated channel width exceeds 5m	Resident and migratory fish populations; Important over wintering, feeding and rearing habitat; Important wildlife feeding/travel corridors	Water quality often reflects all upstream land use impacts and natural processes; Primarily sedimentation of stream channels; Loss of wildlife habitat, restriction of movement
Small Permanent	Usually solid although are sometimes broken heavy lines	Permanent streams; Often small valley bottoms; Bench floodplain) development	All year but may freeze completely in the winter or dry up during periods of drought. Some are 'transitional' to intermittent and dry up during drought	Banks and channel well-defined Channel width from greater than 0 7m to 5m Transitional streams channel widths are generally between .4 and 0 7 meters	Significant insect populations; Important spawning and rearing habitat; Resident and migratory fish populations; Over wintering for non-migratory species; Important wildlife feeding/travel corridors;	Primarily sedimentation of stream channels; Water quality and water yield; Fish population sensitive to siltation; Loss of stream bank fish habitat; Loss of wildlife habitat, restriction of movement

Continued...

Table 1. Watercourse Classification

Watercourse Classification					Fisheries/Wildlife Values	Potential Impacts
Type	**Mapping Designation**	**Physical Description**	**Portion of Year Water Flows**	**Channel Development**		
Intermittent	Usually broken line; To be identified during layout	Small stream channels; Small springs are main source outside periods of spring runoff and heavy rainfall	During the wet season or storms Dries up during drought	Distinct channel development; Channel usually has no terrestrial vegetation; Channel width less than 0.4m; Usually some bank development	Food production areas; Potential spawning for spring spawning species; Drift invertebrate populations in pools and riffles; Spring fed areas may provide spawning potential for fall spawning species	Sedimentation from bank and streambed damage will damage fish spawning and invertebrate habitat as well as downstream fish habitat; Water quality and water yield
Ephemeral	Not normally mapped	Often a vegetated draw	Flows only during or immediately after rainfall or snowmelt	Little or no channel development; Flow area is usually vegetated	Siltation may impact fish habitat downstream	Sedimentation downstream due to ground disturbance
Water-Source Areas	To be identified during layout	Areas with saturated soils, surface flow or seepages	All year May or may not freeze in winter	No channel development, but may be pronounced vegetation changes	Year-round springs provide potential value to fall spawning fish; Potential high-use areas terrestrial wildlife	Disturbance may cause downstream sedimentation; Interruption of winter flow may disrupt fish egg incubation; Loss of mineral licks
Lakes	Solid outline a water body Reserved areas noted on referral map	Large water collection areas permanently filled with water	Normally frozen in winter	Shorelines defined by absence of permanent terrestrial vegetation	Important fish-bearing habitat; Important bird nesting/rearing areas	Aesthetic values may be disrupted; Potential for wildlife disturbance; Local sedimentation
Oxbow Lakes	Solid Heavy or Outline	Large water collection area formed when oxbow cut off from main river channel - Often vegetated	Normally frozen in winter	N/A	Important habitat for ungulates	Thermal cover/grazing areas

Table 2. Standards and Guidelines for Operating Beside Watercourses

Watercourse Classification	Roads, Landings, Decking and Bared Areas	Watercourse Protection Areas	Operating Conditions Within Riparian Areas and Water Source Areas Where Operations are Approved	
			Tree Felling	Equipment Operation
Class "A" Waterbodies	Not permitted within 100m of high water mark. Any existing roads may be maintained at present classification standards. Any proposed watercourse crossings within 2 km upstream must be specifically approved in the AOP.	No disturbance or removal of timber within 100m of the high water mark; No duff disturbance of intermittent (min 10m vegetated buffer) or ephemeral drainages (minimum 5m vegetated buffer) within 2 km upstream of Class A waterbody.	Not permitted without specifi c Alberta approval	Not allowed without specific Alberta approval.
Class "B" Waterbodies	Not permitted within 60m of high water mark. Any existing roads may be maintained at present classification standards. Any watercourse crossings within 500m upstream must be specifically approved in the AOP.	No disturbance or removal of timber within the appropriate riparian area specified by stream type unless specifically approved in the AOP; No duff disturbance of intermittent (minimum 10m vegetated buffer) or ephemeral drainages (minimum 5m vegetated buffer) within 500m upstream of Class B waterbody.	Trees shall be felled so that they do not enter watercourse. Should slash or debris enter the watercourse immediate removal is required without a machine entering the watercourse.	Where removal of timber within 60m is approved, no machinery is permitted within 30m of the high water mark.
Large Permanent	Not permitted within 100m of the high water mark or water source areas within the riparian management zone unless specifically approved in the AOP.	No disturbance or removal of timber within 60m of high water mark unless specifically approved in the AOP. No removal of timber shall be approved within 10 m of the high water mark.	Trees shall be felled so that they do not enter watercourse. Should slash or debris enter the watercourse immediate removal is required without a machine entering the watercourse.	Where removal of timber within 60m is approved, no machinery is permitted within 20m of the high water mark;
Small Permanent	Not permitted within 30m of the high water mark or water source areas within the riparian management zone unless specifically approved in the AOP.	No disturbance or removal of timber within 30m of high water mark unless specifically approved in the AOP. No removal of timber shall be approved within 10 m of the high water mark. Transitional streams: Buffer of treed vegetation will be left for 10m from the high water mark or to the top of the break in slope, which ever is further.	Trees shall be felled so that they do not enter watercourse. Should slash or debris enter the watercourse immediate removal is required without a machine entering the watercourse.	Where removal of timber within 30m is approved, no machinery is permitted within 20m of the high water mark;

Continued...

Table 2. Standards and Guidelines for Operating Beside Watercourses

Watercourse Classification	Roads, Landings, Decking and Bared Areas	Watercourse Protection Areas	Operating Conditions Within Riparian Areas and Water Source Areas Where Operations are Approved	
			Tree Felling	Equipment Operation
Intermittent	Not permitted within 30 m of the high water mark or water source areas within the riparian management zone unless specifically approved in the AOP.	Buffer of brush and lesser vegetation to be left undisturbed along the channel. Width of buffer shall vary according to soils, topographical breaks, water source areas and fisheries values.	Trees shall be felled so they do not enter watercourses, unless otherwise approved by Alberta. Should slash or debris enter the watercourse, immediate removal is required without the machine entering the watercourse.	Heavy equipment may operate within 20 m only during frozen or dry periods. No skidding through watercourse except on snow/ice bridge or logfill. Crossings must be planned with adequate crossings to be removed on completion of operations. Where fish and spawning movements have been identified, special crossings that do not obstruct upstream fish passage or cause stream siltation may be required.
Ephemeral	Construction not permitted within a watercourse or water source area.	Buffer of undisturbed vegetation in wet gullies, Class "A" and "B" waterbody tributaries to be left undisturbed.	Accumulations of slash and debris to be removed progressively.	Skidding restrictions apply on Class "A" and "B" waterbody tributaries; Skidding shall only be during dry or frozen conditions; Temporary crossings to be removed on completion of operations; On Class "A" and "B" waterbody tributaries, special crossing structures that do not cause stream siltation may be required.
Lakes (little or no recreation, waterfowl or sportfish potential	Not permitted within 100m of high water mark unless specifically approved in the AOP.	On lakes exceeding 4 ha in area, no disturbance of timber within 100 m of high water mark except where specifically approved in FHP. Where approval is granted to remove timber within the 100m zone, no timber shall be removed within 30m of the high water mark.	Trees shall be felled so they do not enter watercourses, unless otherwise approved by Alberta. Should slash or debris enter the watercourse, immediate removal is required without the machine entering the watercourse.	If timber removal is approved, no machinery to operate within 40 m of the high water mark.

Table 2. Standards and Guidelines for Operating Beside Watercourses

Watercourse Classification	Roads, Landings, Decking and Bared Areas	Watercourse Protection Areas	Operating Conditions Within Riparian Areas and Water Source Areas Where Operations are Approved	
			Tree Felling	Equipment Operation
Lakes (with recreational, waterfowl or sport fish potential)	For shorelines not located within reserved areas, no disturbances shall be permitted within 200 m of the high water mark unless specifically approved in the AOP.	On lakes exceeding 4 ha in area, no disturbance or removal of timber within 100 m of the high-water mark. Alberta in the FHP may require additional protection On lakes less than 4 ha, removal of timber prohibited within 30 m of the high-water mark and any removal within 100 m requires Alberta's approval.	Trees shall be felled so they do not enter the waterbody, unless otherwise approved; Should slash or debris enter the watercourse, immediate removal is required without the machine entering the watercourse	Consideration must be given to aesthetics when harvesting adjacent to lakes with recreational potential.
Water source Areas and Areas Subject to Normal Seasonal Flooding	Construction not permitted unless approved in the AOP; No log decks permitted, The number of stream crossings must be minimized; No disturbance of organic duff layers or removal of lesser vegetation.	Treed riparian management zone of at least 20 m on all water source areas; No harvest of merchantable trees or disturbances of lesser vegetation unless specifically approved in the AOP; Buffer width may be altered according to its potential to produce surface water, provided it is approved in the AOP	Heavy machinery not permitted with in water source areas during unfrozen soil conditions; Minimal disturbance or removal of duff or lesser vegetation; Timber may be harvested if stream sedimentation is the only resource concern, provided there is no disturbance of the organic soils and lesser vegetation when harvesting the trees; On unstable areas subject to blowdown, merchantable trees shall be carefully harvested from water source areas to minimize root disturbances of duff layers and watercourse damming.	Road construction, timber harvest, reforestation and reclamation shall be done with equipment capable of operating without causing excessive disturbance to the soil layers; Heavy equipment is not permitted during moist or wet soil conditions, but bay be operated during frozen periods, No soil caps or depositing of soil permitted on roads in water source areas, unless a separation layer is incorporated or the road is designed to provide adequate surface and sub-surface drainage away from the road bed, Where a separation layer is used, the soil cap shall e removed as operations are completed.
Oxbow Lake	Construction not permitted within 100m of oxbow lake unless specifically approved in the FHP.	The buffer shall encompass the area from the high water mark of the main watercourse to 20m beyond the high water mark of the oxbow lake. Oxbow lakes outside the buffer of the main watercourse shall be treated as watersource areas.	Heavy equipment not permitted around oxbow lakes during unfrozen conditions. Trees shall be felled so they do not enter the waterbody, unless otherwise approved; Should slash or debris enter the watercourse, immediate removal is required without the machine entering the watercourse.	Approved activities shall be done with equipment capable of operating without causing excessive disturbance.

See Water Act for definitions of class A and B waterbodies.

7.0 HABITAT MANAGEMENT

7.1 LANDSCAPE PLANNING AND HARVEST AREA DESIGN

PURPOSE

To implement timber operations in a manner that ensures landscapes maintain biodiversity and ecosystem function.

DISCUSSION

Forest operators are expected to manage the forest cover in a manner that maintains biodiversity and ecological integrity. The SHS approved in the FMP is the mechanism by which the forest cover is managed.

Within landscapes managed for timber production, landscape patterns, cover types and seral stages can be managed to produce a desired future forest. The coarse filter approach to maintaining biodiversity in managed landscapes involves managing for suitable amounts and patterns of all forest cover types and all seral stages, along with managing for inherent natural spatial and temporal variability.

The variability of natural disturbances shall be considered when planning harvest area size and shape. This variability will help to provide habitat for species that are dependent on natural disturbance regimes. The use of Alberta Vegetation (AVI) polygon boundaries will help to plan this variability. Use of natural features as harvest area boundaries is consistent with natural disturbance and shall be used whenever possible.

Landscape planning requires that targets be set that are measurable. Targets describe the amount of each landscape element that will be created, maintained, or managed, as well as the spatial and temporal variability (expressed as a range) of each. Creating variability in natural landscapes is important because element amounts vary between landscapes, and the requirements of biota also vary. Targets will be refined over time using analysis based on natural disturbances, natural succession processes, current and historical conditions within the region, sub-region and ecodistrict or ecoregion.

Wildlife species of special management concern are major considerations in the selection of the SHS in the FMP.

Wildlife movement corridors are required to ensure that animals with large home ranges find passage between and within managed landscapes. When planning for wildlife habitat and movement corridors, the following factors shall be considered: watercourse classification/ profile/ pattern and associated valley definition, timber types and proximity to watercourses, travel corridor width, harvesting method, harvest area shape, continuity of forest cover or adjacency/size of forest patches.

GROUND RULES

If not otherwise addressed in an approved FMP, SHS or structure retention strategy, the following ground rules shall apply:

7.1.1 Unless otherwise approved by Alberta, the size distribution of harvest areas within a compartment shall be representative of the natural variation of the landscape, which for the purpose of harvest planning, is the range of stand polygon sizes prior to harvest within the compartment boundary.

7.1.2 Adjacent watersheds of small permanent watercourses shall have wildlife corridors connecting their uplands. This corridor should be focused on natural travel corridors and may contribute towards structure retention targets.

7.2 HARVEST AREA DESIGN AND LAYOUT

PURPOSE

To provide direction for designing harvest areas.

DISCUSSION

Detailed planning of harvest areas must address reforestation, wildlife habitat (e.g., line of site, hiding cover, sensitive sites), watercourse protection, integration with other land uses, understorey protection, structure retention, road development and reclamation, and visual quality.

The following items affect harvest area size and shape:

- Current inventory polygon boundaries
- Tree species, age and silvicultural characteristics
- Habitat requirements of species of management concern and species at risk
- Key wildlife zones
- Amount and distribution of non-productive lands and immature treed lands
- Location and size of watercourses and buffers
- Location of roads, pipelines and power lines
- Topographic features
- Presence of viable understorey
- Retention of shrub and tree patches
- Accessibility to all or part of the compartment
- Potential blowdown of peripheral and within-harvest area trees
- Insects and diseases
- Visual sensitivity

In the absence of a SHS, a preliminary harvest plan will be required in addition to the final harvest plan.

PRELIMINARY HARVEST PLAN

The primary components of the Preliminary Harvest Plan (PHP) includes a verification of timber merchantability, accessibility, and condition and outlines a preliminary harvest design showing all existing and proposed harvesting activity within a defined area.

The defined area, which should be consistent with the approved General Development Plan (GDP), should also identify and classify all watercourses, critical wildlife habitat, as well as existing trails, seismic, power lines, and access within the planning area.

During the development of the PHP, efforts shall be made by the operator to notify all overlapping disposition holders and stakeholders that may be affected by the proposed development.

GROUND RULES

In the absence of a SHS the following ground rules apply:

7.2.1 **A preliminary harvest plan, PHP, shall be developed and submitted for approval by Alberta which incorporates a two-pass harvest system, or multiple entry system where agreed to.**

7.2.1.1 **A PHP shall be completed and approved by Alberta in the absence of a SHS.**

7.2.1.2 **The preliminary harvest plan will verify merchantable and unmerchantable timber types.**

7.2.1.3 **Harvest area design and layout as in section 7.2.**

7.2.1.4 **Maps shall accurately show the following information**

- **a) The approved forest inventory**
- **b) Area (ha) and coniferous and deciduous volume for each proposed harvest and reserve area**
- **c) All proposed roads within the harvest area boundaries**
- **d) Current dispositions and reserves, e.g. Registered Trapline Boundaries, permanent sample plot locations**
- **e) Watercourses, their classifications and protective buffers**
- **f) The location of all known springs, water source, and seepage areas**
- **g) Road corridors and LOC numbers and classes for both existing and proposed roads.**
- **h) Planned water course crossing locations**
- **i) Current information on previous harvest areas, existing trails, seismic lines, power lines, pipelines and access routes**
- **j) Sensitive wildlife areas as per section 7.7.6.2**
- **k) Mark known important wildlife sites, e.g. mineral licks, nesting sites, denning and birthing sites**
- **l) Proposed integrated harvest areas**

7.2.1.5 **Road design and location shall be described for all roads joining harvest areas, and LOC roads to be constructed for extraction of timber from all proposed harvest areas. These road comments include the following:**

- **a) Road design and classification**
- **b) Choice of corridor location and width**
- **c) Considerations made for other road users**
- **d) Considerations made for non-timber users**
- **e) Integration of existing roads into the design**

7.2.1.6 **Where two or more overlapping timber dispositions shall be harvested, the respective companies shall cooperatively develop an integrated harvest plan. (see section 5.1.1)**

7.2.2 **Where a two-pass harvest is planned, all timber stands in a timber disposition that currently meet the merchantability standards and are near, at, or older than rotation age shall be included in the harvest design. No more than 50% of the merchantable area shall be in first pass blocks.**

7.2.2.1 **<u>Pine and Deciduous Harvest Area Sizes:</u> Harvest areas in deciduous stands or in stands where pine comprises 40% or more of the merchantable timber volume (evenly distributed throughout the harvest area) may be up to 100 hectares in area unless otherwise approved by Alberta, but shall average no more than 60 hectares.**

7.2.2.2 **Spruce Cutblock Size: Cutblocks in spruce timber may be clearcut to a maximum area of 24 hectares in patches, or to a maximum area of 32 hectares in strips where no part of the harvest area is further than 150 m from a suitable seed source. When a forest operator with responsibility for reforestation commits, in writing, to treat and plant the harvest area within 24 months of harvesting, the operator may increase the harvest area size to that allowed for pine and deciduous (see 7.2.2.1).**

7.2.2.3 **Subsequent-pass harvest areas may be approved for harvest when previously cut harvest areas are reforested to Survey Manual standards and the following height requirements are met:**

a. **coniferous harvest areas: regeneration has reached 3 m where a two-pass harvest is planned.**

b. **deciduous harvest areas: regeneration has reached 3 m in height and ten years have passed since the previous harvest pass.**

7.2.3 **Irregular or natural boundaries shall be employed in the FHP harvest area design. New harvest designs in areas previously harvested shall create natural boundaries.**

7.2.4 **Line of sight shall be minimized where harvest areas are adjacent to accessible permanent Class I, II or III roads. Targets for the limits of sight distance shall be 400 m, but may be exceeded if well justified in FHP.**

7.2.5 **Roadside vegetation shall be protected in harvest areas to limit the line-of-sight distance across the harvest area. To minimize breaks in the vegetation screen, only one road entry point shall be commonly allowed into the harvest area.**

7.2.6 **Direct distance to wildlife hiding cover shall not exceed 200 m.**

7.2.7 **Timber harvesting shall not occur on any area where the likelihood of soil water table increases following harvesting is high, and the risk that the reforested area will not achieve the regeneration standard is also high.**

7.2.8 **Practices required by other disposition holders must be implemented. (e.g., pipeline crossings, road use agreements, operating constraints around power lines).**

7.2.9 **Alberta permanent sample plots shall not be disturbed or harvested unless such action is approved by Alberta. These plots shall also be protected from blowdown.**

7.3 DEBRIS MANAGEMENT

PURPOSE

To manage the amount and distribution of woody debris left in harvest areas to:

- **minimize wildfire risk, particularly near communities**
- **optimize ecological benefits**
- **minimize the loss of productive landbase**

DISCUSSION

Debris or slash accumulation resulting from timber harvest operations must, as a priority, be redistributed or disposed of to minimize the risk of wildfire ignition and spread. However, it is recognized that some retention of debris is valuable from an ecological perspective, and that a

reasonable amount of debris retention shall occur to emulate natural forest floor accumulations. Ecological benefits include microtine habitat, furbearer habitat (when piled), and soil nutrient inputs. When debris is maintained, it must be in such a distribution and amount to: 1) minimize wildfire risk as a priority, 2) minimize the amount of productive landbase loss by limiting lost area available for deciduous species suckering, or tree planting, and 3) provide ecological benefit (coarse filter vs. fine filter).

Acceptable methods of reducing slash hazards are defined in FPD policy Debris Disposal Requirement for Logging Operations (see Appendix 2 of Annex 4).

GROUND RULES

7.3.1 Slash accumulations resulting from timber harvesting, road, and campsite construction shall be disposed of within 24 months in a manner acceptable to Alberta.

7.3.2 Slash fuel accumulation is not permitted within 5 metres of the perimeter of the harvest area. The bordering undisturbed forest floor shall be used as a benchmark to determine what constitutes a significant accumulation. Unacceptable accumulations include piles of trees or non-merchantable timber, and tops or branches deposited during logging that could create fuel ladders for fire bordering the stand (refer to 9.3 for further requirements).

7.3.3 Piling and burning operations shall :

a. Occur on mineral soil.
b. Not be conducted during the fire season, unless otherwise approved in the Fire Control Plan in the AOP.
c. Follow the Slash Hazard Manual and Prescribed Burning Manual published by Forest Protection Division.
d. Require a post burning survey to ensure all holdover fires are extinguished.

7.4 STRUCTURE RETENTION

PURPOSE

To create temporary refuges for forest biota to re-colonize harvest areas.
To maintain snags and live residual trees in harvested areas for biota that depend on these structures following natural disturbances.
To provide wildlife thermal and hiding cover within harvest areas throughout the rotation.
To provide wildlife travel corridors within large harvest areas and compartments.

DISCUSSION

Although many types of natural disturbance (fire, floods, avalanches, wind events, insects and disease infestations, and slumps) occur within Alberta's forests, fire is the most common. Virtually all trees within intense fires are killed, but following low and moderate-intensity fires many scattered live trees are present. In addition, within all fire types, fire "skips" or "islands" result in residual patches of live trees remaining within larger burned areas. Following other types of natural disturbances, even higher densities of live trees, and patches of live trees, are present. Approximately 30% of the birds and mammals living in Alberta's forests nest, forage or find shelter within live trees that have a basal diameter greater than 20 cm. Many of these species are able to use single large live trees and residual patches of large live trees that remain after natural disturbances.

The retention of single trees and patches of large live trees in harvest areas makes the harvested areas more similar to burned areas. In addition, residual live trees may create some old forest attributes in young regenerating harvest areas. Many of the birds, mammals, insects, beetles, fungi and nonvascular plant species that live in recently disturbed forests require large snags for food and shelter. This unique biotic community changes rapidly as the snags fall and the downed logs are incorporated into the forest floor. Some biota become rare within ten years following a fire, and many of the early colonizing species have disappeared by the time the stand is twenty years old.

Retaining some large snags within harvest areas creates habitat for some biota associated with naturally disturbed habitat. Additional large snags may be created, by retaining large live trees, as some of these trees will die throughout the rotation. To a large extent, however, it will be necessary to rely on natural disturbances to create abundant large snags for biota that depend on this dead woody material.

Where larger harvest areas are created, it is important to retain a number of individual trees, snags and residual tree patches distributed across the harvest area. These residual tree patches shall be located such that natural features, riparian areas, wildlife features, stand structure and composition, and proximity to standing forests are taken into account to maximize their utility or usefulness by the biotic community.

These ground rules describe the average number of patches per hectare of residual material that will be left within harvested areas of a landscape unit for those where this is not defined in a FMP. There may be zero patches of residual structure in any particular harvest area as long as the amount identified in the TSA is met across the landscape over time.

Current information suggests that ecological benefits are directly proportional to the amount of structure retention; ecological benefits increase with greater levels of structure retention. Larger patches of residual structure generally have more benefits than smaller patches (lower blowdown probability, interior forest characteristics, hiding and thermal cover) and patches generally have more benefit than individual stems.

GROUND RULES

7.4.1 Residual structure shall be retained in harvest areas during harvest and silviculture operations (including salvage operations) according to the FMP regarding the amount of structure, size of patches, species, composition, and distribution. In the absence of direction in the FMP, the following standards apply.

7.4.2 The following table describes the average number of patches of residual structure that shall be left within harvest areas. The average number of patches per hectare shall be calculated and implemented at the compartment level. There may be zero patches if residual structure in any particular harvest area as long as there is compensation in other harvest areas to meet the compartment average. There is an acceptable variance of 10% of total area in residual structure by harvest area size class for the compartment.

Harvest Area Size	Patch Type	Average Patches/ha in Compartment
2-20 ha	Small Patch	2
20-60 ha	Small Patch	1
	Large Patch	0.05
60-100 ha	Small Patch	1
	Large Patch	0.1
>100 ha	Small Patch	1
	Large Patch	0.2

7.4.3 Forest operators shall retain structure in the following manner:

a) leave larger patches rather than multiple smaller patches.
b) leave individual stems of residual structure throughout harvested areas, as available.
c) leave as many individual stems of non-merchantable trees, shrubs and snags as operationally and silviculturally feasible.
   I. Leaning snags or trees of non-merchantable species that are greater than 6 m in height that create a safety hazard may be felled to create safe working conditions.
   II. Snags within 40 m of roads, camps, landings, fence lines, power lines and machine maintenance areas may be felled to create safe working conditions

7.4.4 The following are guidelines for the spatial distribution of residual structure:

a) Retain residual structure near woody debris piles (and vice versa).
b) Retain residual structure near the harvest area boundary to create a gradual ecotone between the harvest area and un-harvested forest.
c) Retain residual structure in patterns and locations that minimize the potential for blowdown.
d) Retain residual structure near ephemeral draws and intermittent streams.
e) Retain residual structure within inoperable areas whenever possible.

7.4.5 Forest operators may create stubs anywhere within the harvested area to supplement snag densities, aid in wind-firmness of residual patches or for use as rub posts.

7.5 UNDERSTOREY PROTECTION

PURPOSE

To protect coniferous understorey during timber harvesting and reforestation operations.

DISCUSSION

The main objective of this ground rule is to protect coniferous understories (understorey) that will contribute to future forest values. Understorey protection must be practiced in all stand types containing white spruce understorey, and balsam fir where approved by Alberta. Techniques will vary depending on whether the stand is defined as coniferous or deciduous landbase (see Annex 1, Appendix D for the assignment of understorey stands to coniferous and deciduous landbases).

Two understorey protection techniques are considered:

- **Avoidance** – Used in the deciduous landbase, in white spruce overstory with a white spruce understory, and low density stands and/or highly aggregated (clumped) understorey distribution. Wind buffering tactics and pre-planning not specifically required.
- **Protection** – Used in the coniferous landbase. Wind buffering tactics utilizing structure retention, pre-planned strip harvest/skid trails

In both understorey protection techniques, 50% of the acceptable trees in the understorey must be retained without harvest damage.

The following factors shall be considered when planning for protection of understories:

1. **Landbase Assignment From Approved FMP – coniferous or deciduous**
2. **Understorey Characteristics**: species, density and height, the health and vigour of the understorey, the size and wind permeability of the crown, height-diameter ratio (slenderness coefficient)
3. **Site Conditions** – soil conditions that may limit rooting (e.g., depth to water table), topographic features that may enhance or diminish wind-firmness, adjacent stand features and impacts on understorey wind firmness.

The SHS shall specify stands with understorey sequenced for harvest.

GROUND RULES

7.5.1 The FHP shall specify harvest areas for understorey protection vs. avoidance techniques. Detail on protection techniques shall be described in the FHP harvest area comments and DHAPs.

7.5.2 Understory discovered in the field, but not previously identified shall be protected as per 7.5.4.

7.5.3 Stands shall be assigned to the deciduous or coniferous landbase in the FMP based on the approved vegetation inventory.

7.5.4 A minimum of one half (50%) of the total number of acceptable stems (preharvest) in an understory shall be retained without harvest damage.

7.5.5 Pre-harvest acceptable stems are two metres or more in height, are within 75% of the average understory stand height, have 50% or more live crown, are of good health and vigour, and are crop trees as defined by the Survey Manual.

7.5.6 **Post-harvest acceptable stems have 50% or more live crown and less than 25% of the crown lost due to top breakage, bole scars (bark removed to the cambium) less than 10 cm (vertical length) and less than 20% of the bole circumference, and are crop trees as defined by the Survey Manual.**

7.5.7 **Understory 'protection' shall be practiced in the coniferous landbases. Understory 'avoidance' shall be practiced in the deciduous landbase. Blocks with avoidance techniques and low density evenly spaced understory may achieve less than 50% protection. These blocks must be identified in the FHP before approval will be given.**

7.5.8 **'Protection' techniques involve comprehensive pre-planned strip harvest pattern, controlled random skidding (for clumped u/s distribution), wind buffering tactics such as aspen retention. 'Avoidance' techniques are used for stands with low density and/or highly aggregated (clumped) understory distribution. Wind buffering not specifically pre-planned.**

7.5.9 **A post-harvest regeneration survey shall be conducted 3 - 5 years after harvest to assess success to determine yield curve assignments and protection objectives. In the coniferous landbase the regeneration standard shall be as approved by Alberta. In the deciduous landbase, the regeneration standard shall be the deciduous standard in the Survey Manual.**

7.6 FISHERIES AND THE AQUATIC ENVIRONMENT

PURPOSE

To conduct timber operations in a manner that shall minimally affect:

- **The health, diversity and natural distribution of aquatic biota;**
- **The quantity and productive capacity of the aquatic environment, including fish habitat, and;**
- **Fisheries management objectives identified in the FMP**

DISCUSSION

Current provincial and federal legislation require that the aquatic environment and fisheries resources in Alberta must be protected.

Timber operations can directly affect the aquatic environment and fish habitat in a number of ways. Tree removal in riparian areas and along stream banks can alter light intensity, nutrient supply, sediment inputs, water temperatures, stream bank stability and recruitment of large woody debris to the watercourse. Watercourse crossings, if not properly designed, can create physical barriers to the movement of fish and other aquatic biota along watercourses. Roads and ditches can intercept and transport sediments from the upland source to crossing sites where they are deposited in the watercourse. Upland timber harvesting can also affect watershed water yield and flow regimes. These effects can lead to changes in aquatic primary productivity, food-web pathways, aquatic species abundance and distribution, and channel morphology.

The primary strategy for maintenance and protection of the aquatic environment and fish habitat values is to maintain treed buffers along watercourses and water bodies and adopt rigorous watercourse crossing and erosion control measures. Alternate management proposals for riparian areas would be considered to support aquatic environment and fisheries management objectives in the area, where acceptable to Alberta.

Authorizations by Alberta do not imply authorization under federal legislation and requirements, notably the federal Fisheries Act. The proponent must seek advice and approvals of the federal agencies (Department of Fisheries and Oceans) regarding federal legislation requirements.

Additional ground rules for any work carried out in and around watercourses are found in section 11.4 – Watercourse Crossings.

GROUND RULES

7.6.1 All waterbodies and watercourses are presumed to be fish bearing or support fish-bearing habitat. However,

The company may confirm the distribution of fish and fish habitat within the planning areas by:

a) checking the Fisheries and Wildlife Management Information System (FWMIS), Water Act Codes of Practice and fisheries inventory data, or

b) conducting new inventories, or

c) consulting with the appropriate Area Fisheries Management Biologist.

7.6.2 For any activity that disturbs or alters the bed and banks of a fish-bearing waterbody, an assessment of the potential effects on fish and fish habitat must be conducted by an individual with expertise in fisheries and aquatic assessment methods and habitat mitigation measures. For assessment requirements and methods, refer to Schedule 4 of the Code of Practice for Watercourse Crossings Guidelines for Complying with the Code of Practice for Watercourse crossings.

7.7 SPECIES OF SPECIAL MANAGEMENT CONCERN

PURPOSE

To conduct planning and timber operations in a manner that shall:

- **Conserve and plan for an agreed upon level of effective habitat for species of special management concern including woodland caribou, grizzly bear, trumpeter swan and others as determined by Alberta from time to time.**
- **Maintain the effective habitats for ungulates in river valley environments.**

Ground Rules

7.7.1 Woodland Caribou, Grizzly Bear, and Ungulate Habitat in River Valleys

7.7.1.1 To the extent possible, all new access roads must follow existing disturbances, unless doing so will compromise options for subsequent access management (i.e., "traditional access" issues).

7.7.1.2 Preference shall be given to development and use of winter (frozen ground) roads since this reduces negative impacts on wildlife, permits minimization of long-term infrastructure, and facilities reclamation.

7.7.1.3 It is recognized that in some cases work will occur throughout the winter season to take advantage of frozen ground access. Frozen ground operations using frozen ground roads take precedent over early-in/early(add to glossary - early winter where non-frozen to partially frozen access is possible)-out. Completing operations in ungulate habitat areas early in the winter season remains a management objective.

7.7.1.4 As an alternative to winter (frozen ground) roads, summer roads may be developed and used, subject to the following:

a) Road width and grade shall be minimized. Preferentially, summer roads shall be temporary "dry weather" routes, with use suspended when ground conditions are unfavourable.

b) Summer harvesting areas shall preferentially be located outside of Caribou and Grizzly range as well as outside of Ungulate Habitat in River Valleys, or as an alternative, in proximity to previously existing all-weather access roads to assist in reducing the need for new summer access routes. As an alternative, summer harvesting in more remote areas shall have hauling deferred to take advantage of frozen ground conditions.

7.7.1.5 Except where identified and agreed upon within the FHP, only temporary access roads shall be used.

7.7.1.6 Roads shall be built no sooner than one year prior to harvesting operations. Temporary roads shall be re-contoured and reclaimed (and potentially reforested) within 18 months of completion of harvesting and hauling operations, unless otherwise agreed to in the operating schedule.

7.7.1.7 As agreed to between the company and Alberta, effective forms of public access control for highway vehicles shall be maintained. Control of highway vehicle use of any open temporary or permanent access route may be required. All

"non-traditional" (define in glossary) access routes that are open must have measures in place to prevent highway vehicle traffic. Options for access management on "traditional" routes must be considered during the CA or FHP. The need for options to manage off highway vehicle traffic must be considered in the CA or FHP. See section 11.5 for more detail on Access Management.

7.7.1.8 Reclamation techniques used on access routes must strive to prevent highway vehicle use and limit off-highway vehicle use.

Woodland Caribou

DISCUSSION

The FMP strategies and SHS shall describe the harvesting program that will create the desired future forest, taking into consideration the full range of values including habitat for species of special management concern.

Woodland caribou are classified as a "Threatened" species under both the Alberta Wildlife Act and the National COSEWIC/RENEW system. The Federal Species at Risk Act (SARA) shall apply to woodland caribou in Alberta. The "1996/97 Operating Guidelines for Industrial Activity in Caribou Ranges in West Central Alberta" and the "2001 Boreal Caribou Committee Strategic Plan and Industrial Guidelines for Boreal Caribou Ranges in Northern Alberta" provide background, intent, and specific direction for managing industrial work on caribou range. Both national and provincial woodland caribou recovery processes have been initiated which may have implications for timber harvesting in Alberta. Woodland caribou range is delineated on provincial land use referral maps.

Timber operations and management in caribou range can affect caribou populations and habitat directly or indirectly and in four main ways: 1) creating and maintaining public access routes, 2) altering natural and human-caused mortality rates on caribou populations (both through access route development and habitat changes), 3) altering the amount, quality, and effectiveness of caribou habitat, and 4) dis placing and causing undue sensory disturbance to individual caribou. All of the four factors are consequential for caribou conservation; however, predation rates and habitat changes are of primary concern.

The negative effects of creating and maintaining access routes (public travel, predation, reduced habitat effectiveness, disturbance and displacement) shall be managed by planning the amount, tenure and class of new access routes (roads), and by reviewing and acting upon management options (i.e., access management, abandonment, reclamation) for existing routes.

7.7.2 Woodland Caribou

Planning

7.7.2.1 If not addressed in the approved FMP and SHS strategies, a CA must be completed that addresses the following issues:

a. Provide an agreed upon habitat supply forecast including the amount, type, and spatial arrangement of Caribou habitat.
b. The location of all proposed harvest areas.
c. Options for partial harvest systems.
d. The amount, alignment, standard (road type) and longevity (tenure) of all access roads.
e. Use of, and improvements to existing access roads.
f. Access road reclamation plan and schedule, which shall also consider options for reforestation of roads. This shall take into account reclamation options for existing ("traditional") access routes.
g. Measures to achieve public and industrial access management.
h. Operating schedule (road construction, harvesting, silviculture).
i. Protection of key caribou habitat features (as identified by Alberta and company).
j. Terrestrial lichen management strategies (in relation to both harvesting system and silviculture prescription).
k. Proposed summer operations.

7.7.2.2 Silvicultural prescriptions shall strive to limit non-coniferous shrub and tree regeneration in habitats dominated by coniferous species prior to harvest, and where regeneration to coniferous-dominant stands is planned. Silvicultural prescriptions shall strive to protect existing terrestrial lichens, and facilitate terrestrial lichen regeneration. (see section 8.0 for silvicultural prescription requirements)

7.7.2.3 A sufficient amount of habitat (considering both habitat quality and effectiveness) must be maintained at all times within the caribou ranges. The FMP shall provide direction of the amount, configuration and location/adjacency of harvest areas and older seral stage retention areas, and on rate of harvest.

7.7.2.4 Harvesting operations shall be "concentrated" spatially within caribou range. Provided green-up requirements are met (unless otherwise approved by Alberta), reserve harvest area harvesting within previously existing two or three-pass harvest designs within caribou range shall occur prior to new harvest areas being opened up.

7.7.2.5 In reserve harvest areas, special consideration must occur during the CA if green-up requirements have not been met or if the resulting post-harvest opening size will exceed 1000 hectares. Special planning and operational tactics shall be defined to address potential watershed and reforestation concerns. This could include providing supporting documentation and applying innovative techniques to promote snow catch and reduce impacts of wind exposure.

7.7.2.6 New harvest areas in caribou ranges shall be no larger than 1000 hectares.

7.7.2.7 Structure must be left within harvest areas situated in caribou range, and shall form part of the 1000 hectare maximum area of harvest. Retention patches shall be used in large harvest areas to protect areas of concentrated terrestrial lichen growth, and reduce, watershed, aesthetic, and wildlife related concerns.

7.7.2.8 Areas of concentrated terrestrial lichen growth (where terrestrial lichens are the predominant ground cover) within proposed harvest areas must be delineated in the FHP. DHAPs which identify protection measures must be provided to the operator for these areas. Structure retention in harvest areas within the Caribou range should focus on these lichen areas. Alberta may request a review of these plans at any time.

7.7.2.9 Winter operations are preferred to protect existing terrestrial lichen growth within harvest areas, and to retain lichen propagules.

7.7.2.10 Harvest area boundaries shall be based upon natural stand edges, breaks in topography, and other natural features.

7.7.2.11 While maintaining safety, Class roads within caribou zones shall have narrower and more temporary road surfaces than those built to road standards outlined in Table 3. Table 3A provides guidance towards achieving these objectives. The goal is for development frozen ground access to minimize grade development.

7.7.2.12 Summer harvesting areas shall preferentially be located outside of caribou range or if within caribou range, be located in proximity to previously existing all-weather access roads to assist in reducing the need for new summer access routes. As an alternative, summer harvesting in more remote areas shall have hauling deferred to take advantage of frozen ground conditions.

Grizzly Bear

DISCUSSION

The SHS and FMP shall address the harvesting program that is agreed will create the desired future forest, taking into consideration the full range of values including habitat for species of special management concern.

Grizzly bears are classified as a "May be at Risk" species under the Alberta Wildlife Act and as a species of "Special Concern" under the national COSEWIC system. The Federal Species at Risk Act (SARA) shall apply to grizzly bears in Alberta. A provincial grizzly bear recovery process has been initiated which may have implications for timber harvest in Alberta.

Timber operations in grizzly bear range can affect grizzly bear populations directly or indirectly in three main ways: 1) altering natural and human caused bear mortality rates through the creation and maintenance of access routes 2) altering the amount, quality, and effectiveness of grizzly bear habitat, and 3) displacing and causing undue sensory disturbance to individual grizzly bears.

Landscape level planning is necessary to ensure the availability of effective habitat and managing mortality risk for grizzly bears. The indicators of suitable landscape conditions for grizzly bears are habitat effectiveness, security areas, road density and habitat connectivity. Specific strategies for landscape planning for grizzly bear shall be agreed upon in the FMP and at the (CA) level.

Creating and maintaining access routes have negative effects on grizzly bear populations through increased mortality rates, disturbance and displacement. These negative effects shall be managed by minimizing the amount, tenure and class of new access roads, and by reviewing and acting

upon management options (i.e., access management, reclamation strategies for existing routes, avoiding or minimizing access development in critical grizzly bear habitat and by using grizzly bear habitat maps in planning new access).

GROUND RULES

7.7.3 Grizzly Bear

Planning

7.7.3.1 Unless specifically addressed in an approved SHS and FMP strategies, a CA must be completed that addresses the following issues within identified Grizzly Bear areas:

(a) Provide an agreed upon habitat effectiveness (including mortality risk) supply forecast including the amount, type, and spatial arrangement of Grizzly habitat. (completion of this forecast is subject to more technical direction from Alberta)
(b) The location of all proposed harvest areas.
(c) The amount, alignment, standard (road type) and longevity (tenure) of all access roads.
(d) Use of and improvements to existing access roads.
(e) Access road reclamation plan and schedule, which will also consider options for reforestation of roads. This shall take into account options for existing ("traditional") access routes.
(f) Effective measures to achieve public and industrial "highway vehicle" access management.
(g) General operating schedule (road construction, harvesting, silviculture).
(h) Protection of key grizzly bear habitat features (as identified by Alberta and company).
(i) Berry crop management strategies (in relation to both harvesting system and silvicultural prescription).
(j) Proposed summer operations

7.7.3.2 Companies shall minimize the amount, class, and tenure of roads in identified grizzly bear habitat.

7.7.3.3 Summer roads and crossings should attempt to avoid riparian corridors. Those routes that lie within riparian corridors shall minimize the ROW width and reduce vehicle speeds through construction standards and company operating procedures

7.7.3.4 Roads, skid trails, landings and campsites shall be located where they avoid natural meadows and den locations.

7.7.3.5 New road applications in grizzly bear range shall be planned to include a schedule of reclamation and/or deactivation to minimize the establishment of long-term permanent access.

7.7.3.6 The FMP shall provide guidance on the distribution of harvest area sizes.

7.7.3.7 Known or discovered den sites shall be buffered from harvest area boundaries with a minimum of 100 m.

7.7.3.8 Retention areas should be used in harvest areas to provide hiding cover and connectivity to forest patches. Harvest area boundaries shall be based upon natural stand edges, breaks in topography, and other natural features.

Trumpeter Swan

DISCUSSION

The FHP shall describe the harvesting program that is agreed will create the desired future forest, taking into consideration the full range of values including habitat for species of special management concern.

Trumpeter swans are classified as a "Threatened" species under the Alberta Wildlife Act. The Recommended Land Use Guidelines for Trumpeter Swan Habitat in Alberta" located at http://www3.gov.ab.ca/srd/fw/landuse/index.html provides background, intent, and specific direction for managing industrial work near trumpeter swan breeding wetlands. Locations of breeding wetlands are found on provincial land use referral maps. A provincial trumpeter swan recovery process has been initiated which may have implications for timber harvest in Alberta.

Trumpeter swans are sensitive to human disturbance, and human activity in breeding areas may decrease survival of eggs or cygnets. Trumpeter swans that are disturbed may not nest or may abandon an existing nest. Therefore, the breeding population continues to be dependent on current management practices and habitat protection.

Timber harvest planning and operating ground rules must reflect the sensitive nature of this species. These operating rules serve three primary purposes:

a) protection of the long-term integrity and productivity of trumpeter swan breeding habitat;

b) avoidance of industrial disturbance to trumpeter swans during nesting and rearing of cygnets; and

c) minimize the access created near swan lakes to reduce the potential for secondary disturbance of trumpeter swans from recreational use.

During the breeding season (April 1 to Sept. 30), low-level (<2000') aircraft flights may disturb trumpeter swans. Low-level aircraft flights are discouraged over identified trumpeter swan lakes or water bodies.

GROUND RULES

7.7.4 Trumpeter Swan

7.7.4.1 From April 1 to Sept. 30, there shall be no harvesting, hauling, road building or scarification activity within 800 m of the edge of the woody vegetation adjacent to the identified trumpeter swan lakes or water bodies.

7.7.4.2 There shall be no timber harvesting within 200 m of the edge of the woody vegetation adjacent to the identified Trumpeter Swan lakes or water bodies.

7.7.4.3 An area 200-500 m from the edge of the woody vegetation adjacent to identified trumpeter swan water bodies shall be managed in a manner that provides additional protection for the swans. Special measures shall be determined on a site-specific basis during the FHP. Special measures within this zone shall include site preparation that reduces the potential for future vehicular access, no

general application of herbicides, and attempts to limit maximum line of sight to 100 m. Attempts to retain sufficient structure to contribute to a "forested" habitat in this zone are encouraged. Techniques that limit line of sight and contribute to the treed buffer of the wetland are encouraged.

7.7.4.4 There shall be no development of long-term infrastructure (roads and camps) within 500 m of the edge of the woody vegetation adjacent to the identified trumpeter swan water bodies. Only seasonal winter routes shall be permitted within the 500 m buffer..

Ungulate Habitat in River Valleys

DISCUSSION

The FHP shall describe the harvesting program that is agreed will create the desired future forest, taking into consideration the full range of values including habitat for species of special management concern.

For deer, elk and moose in Alberta, key winter range is often found, in river valleys. These landforms contain the topographic variation and site productivity conditions that provide winter foraging conditions in proximity to forest and topographic cover. Also, south-facing valley slopes have relatively lower snow accumulations and warmer bedding sites. The valley landform itself provides protection from high wind chills. Traditional, high use and high quality winter ranges have been identified and mapped (provincial land use referral maps) on the basis of several decades of winter aerial population surveys, supplemented by habitat assessments using aerial photo interpretation and ground surveys.

Key ungulate winter ranges play a disproportionately large role, given their localized size and distribution, in maintaining the overall productivity of regional ungulate populations. These ranges ensure that a significant proportion of the breeding population survives to the next year. Females not only have to survive, they have to be in good enough shape in the spring to provide a healthy new crop of young.

The "Recommended Land Use Guidelines for Ungulate Habitat in Key Winter Ranges" located at http://www3.gov.ab.ca/srd/fw/landuse/index.html provides background, intent, and specific direction for managing industrial work in these habitats.

Habitat effectiveness, including maintenance of thermal cover, foraging areas and escape cover is important for ungulates. Timber operations within and adjacent to key wintering areas adds stress and increases energy drain for animals. They may be forced to move about unnecessarily and even relocate too less favourable habitat. This becomes an increasingly significant factor as winter progresses. Activities associated with timber harvest may also create temporary and permanent access that exposes animals to additional non-industrial disturbances, increased levels of harvest from licensed and non-licensed hunting, and to increased predator efficiency.

In the interest of maintaining productive ungulate populations, operating ground rules must reflect an understanding of the biology of these animals and the importance of their key winter ranges. These must serve two primary purposes:

a. protection of the long term integrity and productivity of key ungulate winter ranges, and:
b. avoidance of direct and indirect disturbance to animals that are using these winter ranges during the mid-to late-winter period.

Ground Rules

7.7.5 Ungulate Habitat in Major River Valleys

7.7.5.1 The FMP and SHS shall provide direction on the location/adjacency of harvest areas and retention areas, and on rate of harvest.

7.7.5.2 The amount, tenure and class of new access roads shall be minimized and consistent with the land use objectives in regionally defined key wildlife zones (regional LFD land use referral maps). Access development will strive to minimize new human infrastructure.

7.7.5.3 The alignment and standard of new long-term and permanent access roads must be identified and agreed upon within the long-term access plan. New long-term and permanent access roads shall not be developed below the valley "breaks" of rivers, except in isolated cases for river crossings.

7.7.5.4 Any proposed new crossings of rivers and creeks must be identified and agreed upon within the Access Management Plan; new permanent crossings shall be avoided.

7.7.5.5 Where possible all access roads shall avoid known key habitat features.

7.7.5.6 Use of existing access roads must be described in the FHP, with particular reference to public access management, any proposed road improvements and ongoing maintenance. Potential opportunities for partial or complete route closure and/or reclamation following planned harvesting and silviculture shall be discussed.

7.7.5.7 Unless otherwise agreed to in the AOP, timber operations should be conducted outside of the period Jan. 15 to April 30.

7.7.5.8 Broadcast application of herbicide shall not occur within this zone.

7.7.5.9 Mechanical thinning and selective use of herbicide as approved by Alberta may occur within this zone.

7.7.5.10 Stand tending activities shall only remove competing vegetative growth that interferes with free-to-grow standards in order to maintain browse availability.

Other Species

DISCUSSION

Additional habitats of selected wildlife species require maintenance of undisturbed habitats, e.g., breeding or denning locations. These species require specific sites in order to complete all or part of their life cycles.

7.7.6 Other Species

7.7.6.1 Sensitive sites listed below shall be protected by retention of an undisturbed, forested buffer (or other management technique) from the edge of the opening associated with these sites, or from the centre of sites without openings. Both Alberta and the forest operator shall make a reasonable effort to identify sensitive sites in the FHP. Sites discovered in the field shall receive the same

buffer as those sites previously identified in planning. Buffer widths and duration shall be agreed to in the FHP.

7.7.6.2 In the event that site-specific buffers or other management techniques are not agreed to in the FMP and FHP, the following buffer widths shall apply:

Sensitive Site	Width of Forested Buffer
Breeding Sites and Hibernacula of Species At Risk Salamanders, Amphibians and Reptiles	100 m
Bat Hibernacula	100 m
Colonial Bird Nesting Area	100 m
Sandhill Crane Nesting Area	100 m
Wolverine Den	100 m
Mineral Licks	100 m
Raptor Nest Tree	100 m
Natural Springs and Beaver Ponds with no outflow channel	20 m vegetated

8.0 SILVICULTURE

PURPOSE

To plan and implement silvicultural practices that result in reforested stands that meet approved regeneration standards.

DISCUSSION

A reforestation program is required by Alberta under TMR 143.1. The reforestation program is a component of the Annual Operating Plan and contains reforestation prescriptions by strata, and a schedule of treatments for the upcoming year. The proposed reforestation program provides a link between reforestation operations and the FMP. The reforestation program must be based on the most current knowledge of treatments (by strata) which lead to reforestation success in terms of reforestation standards. Reforestation prescriptions are a critical point in the sustainable forest management planning system where growth and yield strata targets from the FMP are delivered through well-planned silviculture treatments. Knowledge of how sites respond to different treatments result in better treatments, and greater probability of success in meeting growth and yield strata targets, for height, stocking, density and ultimately, strata volumes.

An acceptable silvicultural process includes:

- Site assessment (pre or post harvest) based on ecosite classification
- A prescription table or 'matrix' of silviculture treatments or tactics for specific strata
- Regeneration standards based on yield curve strata targets
- An annual treatment schedule of activities
- An assessment/survey system, and feedback mechanisms to ensure regeneration data is used to refine the prescription matrix and, in conjunction with all data sources (including permanent sample plot information), the regeneration standards and post harvest growth and yield assumptions.

GROUND RULES

8.1 PLANNING

8.1.1 All harvest areas shall be treated in a manner designed to ensure that the harvest area shall be reforested to the applicable stocking and growth standards described in the Alberta Regeneration Survey Manual (May 1, 2003 or successors) or alternate standards as approved by Alberta.

8.1.2 The conditions outlined by Alberta must be met prior to planning reforestation of balsam fir or alpine fir as an acceptable species. See Directive 2001-01 or successors.

8.1.3 Harvest layouts bordering previously harvested areas shall avoid damaging regeneration.

8.1.4 Reforestation timelines prescribed by Alberta shall begin at the start of the timber year following the end of the timber year when the harvest area has received skid clearance from Alberta, or from a company representative pursuant to a self-inspection agreement between the company and Alberta.

8.1.5 Reforestation prescriptions shall be based on site assessments (pre or post-harvest) that include considerations specific to the site. Eg. Ecosite field guide for Alberta.

8.1.6 The 'Standards For Tree Improvement in Alberta' shall be adhered to in all silviculture planning and operations. The standards specify rules for seed and vegetative material collection, registration, storage, handling, and testing for improved stock.

8.2 REFORESTATION PROGRAM

8.2.1 The reforestation program shall be submitted:

- **a) Before March 1 for silviculture operations commencing between May 1 and October 31, or**
- **b) Before September 1 for silviculture operations commencing between November 1 and April 30, or**
- **c) As otherwise specified in an FMA, or at a time agreed to by Alberta.**

8.1.7 Harvest areas (openings) shall be clearly identified. Eg. maps, spatial files, or delineation on the ground through visual markings.

8.1.8 The reforestation program shall include the following components and information:

- **a.** Silviculture Prescription
- **b.** Proposed Silviculture Treatment Schedule
- **c.** Maps as requested by Alberta
- **d.** Summaries of strata changes and AAC adjustments and
- **e.** Proposed blocks for declaration in lieu of survey and re-treatment.

a. Silviculture Prescription

The Forest Management Plan contains a Silviculture Strategy table for prescriptions specific to different forest stratum. Changes to the approved strategy in the FMP are outlined in the AOP.

Proposals for herbicide application shall be submitted for approval in accordance with approved vegetation management strategies and Alberta requirements. (see Herbicide Reference Manual). Herbicide proposals are a component of the reforestation program in the AOP, but may be submitted separately from the AOP.

Commercial thinning proposals shall be submitted for approval as part of the AOP unless otherwise agreed by Alberta, in accordance with Alberta's requirements.

b. Proposed Silviculture Treatment Schedule

The Silviculture Treatment Schedule shall contain the following information:

- Opening number
- A list of harvest areas and the estimated area (ha) to be treated.
- The reforestation strata standard for each harvest area (see below for more detail)
- Season or date of activity – summer vs. winter

The following proposed reforestation activities for each harvest area (or stand) shall be listed:

I. Site Preparation – mechanical or chemical treatment
II. Planting – primary species, density range, and notification if outside approved seed zone
III. Seeding – species and notification if outside approved seed zone
IV. Leave for Natural – species
V. Manual Tending – Type (cleaning vs spacing or combination)
VI. Fertilization – type of fertilizer
VII. Herbicide/Insecticide application – type of chemical and method (ground vs. aerial) and target species for insecticide
VIII. Commercial Thinning
IX. Regeneration surveys – establishment and performance
X. Cone/cuttings collection – (if unknown, Alberta shall be notified regarding collections as per the 'Standards for Tree Improvement in Alberta)
XI. Let it grow as a retreatment strategy.

Should the proposed reforestation activities for a harvest area change after AOP approval, the following items require an amendment to the AOP:

- changing to a treatment not approved in the silviculture strategy table for the specific strata
- additional harvest areas to be treated by any means of treatment
- the remaining changes require notification to Alberta through ARIS reporting.

If a harvest area is declared sensitive, the forest operator shall provide additional information beyond the strategic and tactical levels (see section 3.4.10). This information shall include the actual techniques (e.g., type of site preparation machine) and their expected impact on the harvest area attribute(s) that make it a sensitive site (e.g., providing frequent furrow trenching breaks on down hill run to reduce erosion).

Note that proposals to deploy seed or vegetative material outside the seed zone or breeding region require prior approval of the Provincial Seed Officer at the Alberta Tree Improvement and Seed Centre.

Sample Silviculture Treatment Schedule

Opening Number (ARIS)	Harvest Area (ha)	Preliminary Strata Declaration	Activity	Activity Area (ha)	Season	Comment
HARN004-001	10	C	Mounding	4	Winter	

c. Map

As part of the reforestation program, a map may be requested (At Alberta's discretion, the FHP map may be used) that identifies:

I. All harvest areas to be treated, and all roads and stream crossings to be constructed or used (designating their season of use).
II. The reforestation map shall include all harvest areas from integrated operations.

d. Summary of Harvest Area Stratum Declarations, Intended Changes, Final Stratum & QAC Adjustment (see Directive 2005-01 for details)

I. A summary of stratum declarations by May 15 of the second year following the year of cut.
II. A summary of intended stratum changes.
III. A final performance report – summary of stratum changes (final stratum) and QAC adjustments (where stratum changes couldn't be balanced) 6 months prior to the end of the applicable 5 year quadrant production control period.

e. A listing of harvest areas where a declaration is proposed in lieu of a survey for areas not likely to meet regeneration standards (per TM Reg 141.9) and harvest areas where re-treatment is proposed (per TM Reg 142.1.)

I. Blocks where 'let it grow' is the retreatment strategy will require survey information supporting re-treatment rationale.
II. May be submitted for review and approval at any time throughout the year for approval to ensure timeliness of treatments.

See Section 12.0 REPORTING for reforestation activity reporting requirements.

8.3 SILVICULTURE OPERATIONS

8.3.1 Site preparation and other silviculture activities must follow the same AOP conditions and ground rule standards which apply to timber operations (i.e., stream crossing requirements, watercourse buffers, tree/understorey retention, and Forest Soils Conservation Guidelines).

8.3.2 All forest operators who are responsible for reforesting their timber disposition shall treat all harvest areas within two years from the end of the timber year when

the harvest area received skid clearance. Non-stocked openings shall be treated within one year of failing an establishment survey.

8.3.3 Establishment and performance regeneration surveys shall be conducted according to the procedures in the Alberta Regeneration Survey Manual, (May 2003 or successors) unless alternate survey methods have been approved by Alberta.

8.3.4 Herbicide, pesticide and fungicide use shall be performed in accordance with Alberta requirements.

8.3.5 Site preparation equipment shall be cleaned and free of restricted and noxious weed seed or plant parts before entry into the working area or before mobilizing between projects according to Alberta requirements.

9.0 SOILS

PURPOSE

To conduct timber harvest, road construction, reforestation and reclamation operations in a way that shall:

- **Minimize the potential for soil erosion**
- **Prevent soil, logging debris and deleterious substances from entering watercourses**
- **Ensure that the capability of the site to support healthy forest tree growth is maintained.**

DISCUSSION

Minimizing soil displacement, compaction and rutting/puddling during road construction, harvesting, and silvicultural operations is a primary concern. Soils are most at risk of compaction and rutting/puddling when the soil is moist or wet, with the more poorly drained soils remaining wetter longer. The soils are equally at risk in the winter months if they are wet and the soil has not frozen, which is a common occurrence. Rehabilitation of compacted soil in harvest areas (off – road) is seldom an option because they are generally wet and additional machine traffic will often cause more soil damage. Therefore, protection of soil is best achieved in choice of equipment, staff training and advanced planning of operations. In terms of advanced planning, it is recommended that a pre-harvest site assessment include the evaluation of soil drainage class across the harvest area delineating sensitive areas with imperfectly and poorly drained soils. Management of field operations shall involve operating on soils when they are as dry as possible. The weather and percentage of sensitive areas in the harvest area shall be taken into account when scheduling areas for harvesting. Following a long dry period in summer, the sensitive sites shall be scheduled accordingly.

GROUND RULES

Pre-harvest planning

9.1 Areas susceptible to rutting, puddling or compaction shall be avoided when planning temporary roads, decks, landings and skidding patterns.

9.2 Areas susceptible to rutting, puddling or compaction shall be harvested during dry or frozen conditions (e.g., harvest areas with predominantly imperfectly-poorly drained soils).

Harvesting

9.3 **The total area covered by temporary roads, rutting, bared landing areas, displaced soil, and debris piles created by timber harvesting operations shall not exceed five percent of each harvest area without prior approval of Alberta.**

9.4 **Operations shall not occur during heavy rainfall or when soil conditions are above field capacity (saturated).**

9.5 Minimize the machine traffic on sensitive areas, depending on soil susceptibility to disturbance according to the results of a hand test. (see figure 1).

9.6 **Operations shall cease when instances of multiple ruts in a limited area are created that are clearly related to operations during unfavourable ground conditions. Not more than two percent of the harvest area shall be disturbed by ruts. Ruts are measured using the linear transect system as defined in the Forest Soils Conservation Guidelines.**

9.7 **Erosion and soil disturbance must be limited, with effort made to retain organic matter and soil nutrients.**

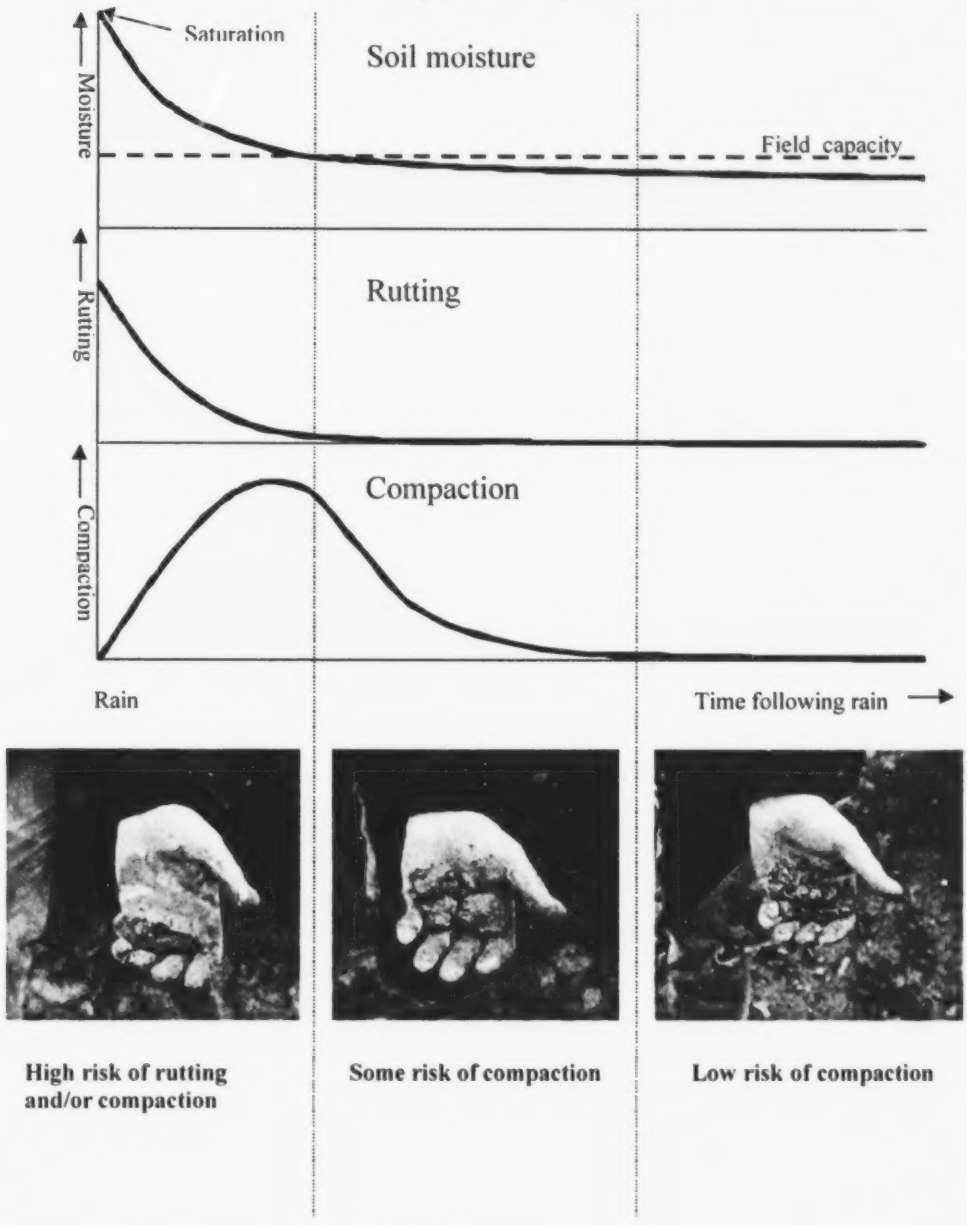
Post-harvest reclamation/reforestation

9.8 **Site preparation creating linear disturbance patterns, shall be oriented to minimize channelling of water downslope.**

9.9 **Roads within harvest areas that are no longer required shall be reclaimed and reforested. Treatments acceptable to Alberta are required on compacted soils.**

Figure 1:

Change in soil moisture and susceptibility to compaction and rutting following rainfall



Courtesy of Andrei Startsev, Alberta Research Council

10.0 FOREST HEALTH/ PROTECTION

10.1 INSECT AND DISEASE

PURPOSE

To minimize the risk of occurrence, and spread of insects and disease, which have the potential to impact forest management objectives.
To prioritize the salvage of timber damaged by insects and disease.

DISCUSSION

The impact of certain insects and diseases shall be addressed when planning harvesting, silviculture operations, and surveys. Several biotic and abiotic forest health agents affect the growth and survival of trees. Each agent poses a threat to the forest. Priority for management shall be given to those agents that have the greatest impact or could potentially cause the most damage by:

a) Increasing the wildfire hazard
b) Reduction or loss of merchantable volume
c) Detracting from landscape aesthetics

The following ground rules do not supercede the management strategies of species of special management concern. Alberta will provide direction where insects or disease concerns overlap with strategies for species of special management concern.

GROUND RULES

10.1.1 Harvest plans and operations shall be prioritized in stands with insect and disease issues. Variance from the SHS to address insect or disease issues may be acceptable if approved by Alberta. Infected and infested stands shall be ranked based on the type and intensity of insect and disease present, or the presence of dead trees. Stands or trees shall be ranked for treatment or harvest as follows:

Rank 1: Stands or trees with the presence of mountain pine beetles or spruce beetles.
Rank 2: Stands with a significant number of dead or dying trees resulting from fire, insects or disease, and windthrow.
Rank 3: Stands infected with mistletoe, spruce budworm, forest tent caterpillar, root disease (Tomentosis, Armillaria) or jack pine budworm.
Rank 4: Stands infected with needle cast, Western gall rust, root collar weevils, Atropellis or other miscellaneous forest health agents.

10.1.2 Management tactics are based on the Forest Protection ranking as follows:

Rank 1 stands or trees: Control Measures must be undertaken before adult beetles take flight, either through harvest or single tree treatment. Alberta and forest operators shall work co-operatively to prevent spread through aggressive action.

Rank 2 stands: Shall be addressed through salvage planning process (see section 3.6, Salvage Planning). Highly unpredictable spread therefore, salvage planning is initiated.

Rank 3 stands: To manage dwarf mistletoe operators shall:
- create a 30 m wide mistletoe-free zone adjacent to the harvest area, or
- create a 30 m wide non-host buffer beside the harvest area perimeter, or

- reforest the harvest area to a non-host species.

Any wildlife tree patches shall consist of non-pine species where possible. For other pests, contact Alberta.

Rank 4 stands: Generally, no control is required for mature stands. Regenerated stands affected by Western gall rust or root collar weevils may require site treatments. Contact Alberta.

10.1.3 Insect and disease assessment information shall be utilized in the CA. Where a CA is not required, the assessment information will be used to develop the GDP. Where new infestations are found, or for known infestations already sequenced through the SHS, they shall be addressed in the FHP.

10.1.4 Any infestation of Rank 1 agents and all data must be reported to Alberta immediately.

10.1.5 Where dues relief is requested, mistletoe infected stands must be surveyed using an acceptable rating system (e.g., Hawksworth system).

10.2 WEED MANAGEMENT

PURPOSE

To minimize the impact of non-native, restricted, and noxious weeds, in the Green Area.

DISCUSSION

The invasion of restricted and noxious weeds in the forested area of Alberta negatively affects the integrity of the ecosystem. The invasive weeds alter natural processes and displace organisms that naturally occur in the area.

Under Alberta statutes, the occupant (or owner if there is no occupant) must destroy all restricted weeds, control all noxious weeds and prevent the spread or scattering of nuisance seeds.

GROUND RULES

10.2.1 Forest operators shall follow Alberta's requirements (Directive 2001-06) for weed management in forestry operations. (see Appendi x 3 of Annex 4)

10.3 WILDFIRE PROTECTION

PURPOSE

To minimize the risk of wildfires, and to improve fire suppression capability.

DISCUSSION

Landscape-level issues regarding the risk of large fires is addressed in the development of the SHS. The FMP shall develop objectives, strategies and tactics that consider the risk of occurrence and spread of fire at the stand and landscape levels.

Opportunities may exist to implement fuel reduction, isolation and conversion on the landscape while accounting for other values. Where applicable, forest operators shall follow the guidelines in the FireSmart Protecting Your Community from Wildfire manual.

GROUND RULES

10.3.1 In areas of high wildfire threat, as determined by Alberta and/or the operator, the forest operator shall consider the following hazard abatement tactics when developing the FHP:

a) Use of herbicides to avoid development of fine fuels
b) Partial cutting or stand tending to reduce crown bulk intensity
c) Harvest area or FHP to consolidate fire resistant features
d) Where social values have been considered, harvest area or compartment scheduling to concentrate on high-risk and high probability stands earlier in the harvest schedule
e) Scarification to redistribute and isolate fuels
f) Stand conversion to promote fire resis tant species. Where species conversion is contemplated, a minimum distance of 100 m is recommended

10.3.2 The fire control plan of the AOP shall contain the following:

a) Duty Roster
b) List of company woodlands personnel and their fire control training
c) Key company contacts
d) Heavy equipment resource list
e) Small hand tool resource list and their location
f) Company communication system and numbers and call-signs
g) Fire prevention policies
h) Fire prevention strategies
i) Fire prevention priorities (high values at risk)
j) Fire operations schedule (i.e., harvesting and silviculture activities within the fire season)
k) Identification of barriers to fire spread.

11.0 ROADS

11.1 ROAD CLASSIFICATION

PURPOSE

To define a road classification system that provides guidelines to all forest operators and potentially all resource users in the Ground Rule Zones.

DISCUSSION

As roads are one of the most significant components of forest harvesting operations, forest operators along with Alberta shall co-ordinate and integrate road planning and construction plans with other resource operators. This classification system will provide consistent working guidelines to be used in planning and operations to facilitate integration. It is important to identify not only construction schedules but closure and reclamation timelines as well. Long term planning of access roads is a significant tactic to address landscape access issues.

GROUND RULES

11.1.1 The operator shall utilize the classification system described in Table 3 during planning and operations.

11.1.2 All roads, regardless of class, with a lifespan of greater than five years shall be built under the authority of a LOC.

Table 3. Road Classification and Design

Road Description and Tenure	Planning Requirements	Layout	Design and Construction Descriptions		Borrow Pits	Timber Salvage	Debris	Erosion Control
			Right of Way					
			Clearing Width	Road Surface Width				
Class I Primary Permanent All Weather 20+ Years	Identified in higher-order plans, i.e., long term access plans Phased planning approach shall be followed LOC required Detailed design plan (see "guidelines")	Centre line marked. Side ribbons required.	30-40 m	8 – 12 m	Location identified prior to construction (EFR) or as per submitted TFA	As per TM Regulations and EFR under LOC.	Total disposal Stripping and fine debris to be retained for erosion control by spreading on cuts and fills and any other critical area	Progressive reclamation concurrent with construction. Cross drains and ditch blocks dictated by slope and soil conditions. Drainage water to be diverted off the ROW in as short a distance as possible
Class II Secondary Permanent All Weather or Dry Weather 5 – 20 + years	Identified in higher-order plans, i.e., long term access plans LOC required Detailed design plan through route selection process a need for detail shall be assessed, i.e., need for cross-sectional profiles based on sensitive area identification	Centre line marked. Side ribbons may be required for LOC roads and sensitive sites.	20 – 30 m	5 – 10 m	Location identified prior to construction (EFR) or as per submitted TFA	As per TM Regulations and EFR under LOC	Total disposal Stripping and fine debris to be retained for erosion control by spreading on cuts and fills and any other critical area	Progressive reclamation concurrent with construction. Cross drains and ditch blocks dictated by slope and soil conditions. Drainage water to be diverted off the ROW in as short a distance as possible

Table 3. Road Classification and Design (continued)

Road Description and Tenure	Planning Requirements	Layout	Design and Construction Descriptions		Borrow Pits	Timber Salvage	Debris	Erosion Control
			Right of Way					
			Clearing Width	Road Surface				
Class III Tertiary Permanent Winter or Dry Weather Up to 20 Years	Phased planning approach must be followed if road is to be used for more than five years. LOC Required if > than 5 years.	Centre line marked. Side ribbons may be required for LOC roads and sensitive sites.	7 – 20 m	5-10 m	Location identified prior to construction (EFR) or as per submitted TFA.	As per TM Regulations and EFR under LOC.	Total disposal. Stripping and fine debris to be retained for erosion control by spreading on cuts and fills and any other critical area.	Progressive reclamation concurrent with construction. Cross drains and ditch blocks dictated by slope and soil conditions. Drainage water to be diverted off the ROW in as short a distance as possible.
Class IV Temporary Winter or Dry Conditions Up to five Years	Details to be addressed in development plans. Approved under the cover of an AOP.	Centre line marked. As-built inside harvest area road locations submitted annually through air photo updates. Harvest area access roads mapped.	7 - 20 m	5 – 10 m	Location identified prior to construction or as per submitted TFA.	As per FHP.	Partial disposal. Mechanical or manual cutting of slash and debris to reduce fire hazard to acceptable levels.	Progressive reclamation concurrent with construction. Cross drains and ditch blocks dictated by slope and soil conditions. Drainage water to be diverted off the ROW in as short a distance as possible.

Table 3A - Road Classification for the Caribou Area

All other criteria from Table 3 apply to the roads in Table 3A

Road Description and Tenure	Season Of Operation	Clearing Width	Road Surface	Grade Description
Class 4F Temporary – up to five years	Frozen Ground (some roads or sections thereof may be accessible during dry periods	Target = 10m, with variable allowance for terrain conditions, to a maximum of 20 meters	8 meters maximum	Target = no grade, recognizing some grade (maximum 0.5meters) may be required on a site specific basis depending on terrain conditions. Ground disturbance to be minimized.
Class 3D/F Up to 20 years LOC Required if > than 5 years	Dry or Frozen Ground	Target = 15m, with variable allowance for terrain conditions, to a maximum of 20 meters	Target 6meters, to a maximum of 8 meters for (one way traffic) Target 7 meters, to a maximum 8 meters (for two way traffic)	Target = grade to be minimized, recognizing some grade (range 0 to 0.5 meters) may be used depending on site specific terrain conditions.
Class 2D/F 5 – 20 years LOC Required	Dry or Frozen Ground	Target = 20m, with variable allowance for terrain conditions, to a maximum of 30 meters.	8 meters	Target = no grade to 0.5 meters, maximum 1 meter, depending on site specific terrain conditions.

11.2 ROAD PLANNING AND DESIGN

PURPOSE

To outline the plan to construct, maintain and reclaim roads.

DISCUSSION

The impacts of roads shall be recognized as long-term. It is therefore important that the initial placement of roads be carefully examined. Resource values shall be assessed during the process in order to best mitigate impacts or enhance benefits associated with those values.

Long term road corridor plans shall be developed in the FMP that meet the requirements of Phase 1 corridor plans as identified below in section 11.2.2 (see Annex 1 section 5.8.7.1). All road construction, maintenance and reclamation shall be directed by strategies outlined in the FMP.

The submission of road plans will assist Alberta to facilitate the integration of access management among all resource users (e.g., oil and gas industry). Road plans shall forecast corridor development linking all compartments and other industrial developments.

Safety needs to be addressed throughout the road planning process.

GROUND RULES

11.2.1 Long-Term Roads (Class I, II, III)

Road Planning

11.2.1.1 Forest operators shall annually submit a road corridor plan and construction schedule in the GDP. Proposed variances from the FMP long-term corridor plan require Alberta's approval. The minimum scope of the road construction schedule shall be a five -year forecast with the content requirements being:

Map showing:

- **Existing forest operator roads by class including un-reclaimed non-LOC roads**
- **Other existing roads if the digital information is available**
- **Proposed forest operator corridors, including corridors approved in the FHP**
- **Access control points – See section 11.5 Access Control**

Tables describing proposed road targets, current status and completed activities (examples below).

Proposed Road Schedule

Comp./ Ops. Area	Road Identifier	Phase 1 Submission	Phase 1 Approval	Phase 2 Submission	Phase 2 Approval	Phase 3 Construction	Tenure

Current Road Status

Comp./ Ops. Area	LOC Number	Road Class	Status	Length	Crossings	Access Control	Tenure

Completed Road Activity (for previous year)

Comp./	LOC	Activity	Date	Comments

Ops. Area	Number			

11.2.2 Phased Planning Process

Phase 1: Corridor Planning

11.2.2.1 The corridor planning process may commence at any time during the year provided that the corridor has been identified in the road plan and dialogue with Alberta has been initiated.

11.2.2.2 The Phase 1 corridor plan for new road proposals requires the forest operator to work with Alberta to:

a) Identify the corridor and potential alternatives
b) Identify other overlapping industrial users and work towards an integrated access/corridor strategy
c) Rationalize the corridor based on timber considerations, i.e., summer vs. winter access
d) Highlight potential impacts on other forest resources, such as:
- **Watercourses**
- **Fish & Wildlife Habitat**
- **Grazing dispositions**
- **Soils**
- **Trappers**
- **Protected areas**
- **Recreation areas**

e) Identify measures designed to mitigate impacts, e.g., timing constraints during construction and access control requirements.

11.2.2.3 The corridor plan shall be submitted prior to road construction in a time frame acceptable to Alberta.

11.2.2.4 Forest operators with overlapping tenures shall consult each other to ensure consistency in their corridor planning.

11.2.2.5 Forest operators shall advise other industrial operators of their road plans and strive to integrate road access with those operators.

11.2.2.6 Corridor plans shall follow the direction in strategic land use plans and policies.

11.2.2.7 The review and approval process is as follows:

a) Two months for review by Alberta –comments back to the forest operator.
b) Forest operators shall address any concerns prior to resubmission.
c) Alberta shall approve within one month of final submission, provided no deficiencies exist.
d) Alberta may identify in the approval additional requirements to be submitted with Phase 2, based on site sensitivity.

11.2.2.8 Exceptions to this process may arise (e.g., a salvage scenario). A written proposed action plan to vary from the indicated timelines must be submitted by the forest operator documenting the reasons for the modified review and approval process. Both the forest operator and Alberta recognize that time may be of the essence.

Phase 2: Detailed Planning

11.2.2.9 In order to reduce submissions and avoid duplication, Phase 2 shall consist of the LOC application process on the Phase 1 corridor.

Phase 3: Construction

11.2.2.10 Road construction shall be carried out as per Table 3 as well as conditions specified in the letter of authority for the LOC.

11.2.2.11 Upon request by Alberta, the road centre-line, as-built, in a format acceptable to Alberta, shall be submitted to Alberta by the forest operator within 90 days of construction.

11.2.3 Temporary Roads: Class III and Class IV (with lifespans up to five years from start of construction).

11.2.3.1 These roads shall be built as per the approved AOP. Only roads with FHP approvals shall be included in the AOP submission. Upon request, within 90 days of construction, as-built road plans shall be submitted to Alberta by the forest operator in a format acceptable to Alberta.

11.2.3.2 The forest operator shall submit a table tracking the status of all non LOC roads over two years old.

11.3 ROAD CONSTRUCTION, MAINTENANCE AND RECLAMATION

PURPOSE

The roads shall be constructed, maintained and reclaimed in a timely manner to minimize environmental impacts.

GROUND RULES

11.3.1 General

11.3.1.1 Existing access (e.g., seismic lines, trails, existing roads), shall be used as a priority wherever practical and feasible.

11.3.1.2 Road ROWs shall be cleared according to standards established in Table 3, road comments, and any additional conditions approved in the FHP.

11.3.1.3 Roads and landings shall be constructed to avoid:

- **a) Unstable soils, water source areas, springs and seepage areas.**
- **b) Creating disturbed, compacted or bared soils that exceed the amount specified in section 9.3 – Soils**

11.3.2 Construction

11.3.2.1 Roads, skid trails and landings shall be placed in locations and constructed so that soil erosion, damage to streambeds and sedimentation of watercourses are minimized.

11.3.2.2 On those parts of the ROW not used for grade construction, disturbance to the duff and organic soil shall be minimized to reduce damage to the roots of bordering trees and to provide a protective soil cover.

11.3.2.3 With Alberta's approval, trees with root systems seriously damaged by road construction activities shall be removed from the edge of a road cut.

11.3.2.4 The fill required for road construction shall be taken from the ROW when feasible.

11.3.2.5 All borrow pits required off the ROW must be authorized by Alberta or an appropriate land use disposition before they are developed.

11.3.2.6 All sand and gravel pits off the ROW must be authorized under an appropriate disposition.

11.3.2.7 Removal of sand and gravel from within the channel or floodplain of any watercourse is prohibited.

11.3.2.8 Active long-term roads shall be properly maintained to reduce wheel or track ruts, and to minimize watercourse sedimentation from erosion and traffic during adverse weather.

11.3.3 Erosion Control/Prevention

11.3.3.1 Erosion control shall be implemented as per Table 3.

11.3.3.2 Initial erosion control measures shall be concurrent with grade construction. Preferably, no more than a two kilometre length of bared surface shall be developed between the time the sub-grade is constructed and the completion of erosion control activities.

11.3.3.3 Constructed roads require erosion control and stabilization of disturbed soils.

11.3.3.4 Ditches shall be constructed to the same gradient as the road and shall be deep enough to drain the sub-grade, unless limited by topography. Ditch backslopes shall have a regular profile from the top of the cut to the bottom with no hanging banks or vertical cuts.

11.3.3.5 Water from roads, ditches and bared soil surfaces shall not be permitted to drain directly into watercourses. Where vegetated buffers alone do not retard water and sediment movement effectively, appropriate obstructions (e.g., logs, rocks, mounds) or sediment control structures shall be installed to dissipate the flow of water and capture sediment prior to entering he watercourse.

11.3.3.6 Cross-drainage culverts and other drainage devices shall be installed as road sub-grade construction progresses. Cross-drainage structures shall:

- **a) Reduce water movement along ditches**
- **b) Divert water from the ROW into the surrounding vegetation directly as possible**
- **c) Provide cross movement for water from seeps and springs**
- **d) Be installed with adequate spillways or downspouts where they drain onto unstable or bare soil.**

11.3.3.7 Re-vegetation shall be completed concurrent with operations or as soon as soil conditions permit during the following growing period. Existing ditch vegetation shall be protected during road maintenance wherever possible and re-established where necessary.

11.3.3.8 A portion of the debris from clearing, and strippings from road and landing construction shall be retained and used for re-vegetation and erosion control on disturbed areas.

11.3.4 Reclamation

11.3.4.1 Roads not under LOC that are no longer required shall be reclaimed, have crossings removed, and their condition monitored until they are considered satisfactorily stabilized (see 11.3.4.7).

11.3.4.2 Certified weed free seed shall be used when seeding is used for reclamation.

11.3.4.3 Roads under LOC that are no longer required shall be reclaimed, and require a Letter of Clearance.

11.3.4.4 All borrow and gravel pits no longer required must be reclaimed (re-contoured to stable slopes and re-vegetated) and require a Reclamation Certificate unless approval has been given to allow water to fill the pit for wildlife or wildfire purposes.

Seasonal Reclamation

11.3.4.5 Certain roads that are not used continuously throughout the year may require intermediate erosion control measures such as:

- **a) Shallow surface cross ditches based on slope and soil type**
- **b) Re-established drainage**
- **c) Slope Stabilization**
- **d) Rut-free driving surface establishment**
- **e) Access control measures**

Partial Reclamation

11.3.4.6 Roads that are not immediately required but necessary for future operations shall be reclaimed to the following standards unless otherwise approved in the AOP.

- **a) Watercourse crossing and drainage structures that have a high risk of erosion or failure are removed, and stream banks and approaches reclaimed.**
- **b) All potentially erodible slopes are stabilized through rollback, seeded to approved vegetation species, and cross-ditched to disperse runoff and suspended sediment into undisturbed areas.**
- **c) Access closure structures are installed where required.**

Total Reclamation

11.3.4.7 Roads and associated bared areas that are no longer required, shall be permanently reclaimed by completing all of the following:

a) **Decompacting, and returning them to an acceptable landform;**
b) **Removing all watercourse crossing and drainage structures and reclaiming stream banks and approaches; (see section 11.4.27)**
c) **Cross-ditching, rolling back topsoil (including slash and logging debris) and re-vegetating a minimum of 90% crown coverage of erodible bared surface areas;**
d) **Reforesting disturbed areas inside harvest areas and where mutually agreed to, outside of the harvest area.**
e) **Establishing access closures where required.**

11.4 WATERCOURSE CROSSINGS

PURPOSE

To provide guidance so that crossings are constructed, maintained and reclaimed in a manner that ensures negative environmental impacts are minimized and fish and fish habitat are protected.

DISCUSSION

It is important to implement watercourse crossings of acceptable standards to meet the needs of all users. Of primary importance is protection of the aquatic environment. It is intended that water quality, fish passage, bank stability and aquatic fauna habitat are not compromised during watercourse crossing construction, maintenance and reclamation.

The planning of watercourse crossings must consider tenure, user integration, timing constraints, existing plans and assessments, and pertinent policy and legislation. Watercourse crossings shall be designed, installed, maintained and deactivated in accordance with all applicable policy and legislation. See Section 7.6.2 and 7.6.3 for additional information on the implications of the Federal Fisheries Act.

GROUND RULES

11.4.1 The Water Act Code of Practice for Watercourse Crossings (Code of Practice) must be followe d for all crossings considering the applicability table outlined below:

Table 4 – Applicability of the Code of Practice

Situation	Exemption in Water Act	Code of Practice Applies	Other Requirements
Culvert crossing where culvert size is less than 1.5 m in diameter and does not alter waterbody characteristics below the 1 in 25 year flood event	**Yes (Exemption applies)**	**N/A (Code does not apply)**	**Annual Operating Plan approval or other approval under the Public Lands Act. Federal Fisheries Act authorization may also be required.**
Single-span bridge crossing where bridge does not alter waterbody characteristics below the 1 in 25 year flood event	**Yes (Exemption applies)**	**N/A (Code does not apply)**	**Annual Operating Plan approval or other approval under the Public Lands Act. Federal Fisheries Act authorization may also be required.**
Culvert crossings where the culvert size is greater than 1.5 m in diameter.	**N/A (No exemption provided for)**	**Yes (Code requirements apply)**	**Annual Operating Plan approval or other approval under the Public Lands Act. Federal Fisheries Act authorization may also be required.**
Ice Bridges	**Yes (Exemption applies except for in areas listed in Schedule 2 of the**	**N/A (Code does not apply)**	**Approval under the Water Act required for ice bridges located in areas listed**

	Regulations)		in Schedule 2 and approval under the Public Lands Act required for all ice bridges.
Log fills	Yes (Exemption applies)	N/A (Code does not apply)	Annual Operating Plan approval or other approval under the Public Lands Act
Bridge crossings greater than one span	N/A (No exemption provided for)	Yes (Code requirements apply)	Annual Operating Plan approval or other approval under the Public Lands Act. Federal Fisheries Act authorization may also be required.
Causeway crossing through a lake or slough	N/A (No exemption provided for)	N/A (Code does not apply)	Annual Operating Plan approval or other approval under the Public Lands Act. Federal Fisheries Act authorization may also be required.

From the "Guide to the Code of Practice for Watercourse Crossings" p. 12

11.4.2 Intermittent and higher-order streams shall be classified in the FHP.

11.4.3 Proposed watercourse crossing structures and locations shall be identified in the FHP.

11.4.4 Unless otherwise approved, watercourse crossings shall:

- **a) Minimize erosion and sedimentation;**
- **b) Have stable approaches;**
- **c) Be at right angles to the watercourse;**
- **d) Be at locations where the channels are well defined, unobstructed and straight;**
- **e) Be at a narrow point along the watercourse;**
- **f) Allow room for direct gentle approaches;**
- **g) Have no direct ditch drainage;**
- **h) Shall have erosion control structures during construction.**

11.4.5 Watercourse crossings shall accommodate peak stream flows at the following levels as measured using a method acceptable to Alberta:

- **a) Long-term roads (Class I – III) – shall be designed for a minimum of 1: 50 year flood levels; and**
- **b) Temporary roads (Class IV) – shall be designed for a minimum of 1:25 year flood levels with the exception of temporary winter crossings that are removed before break-up.**

11.4.6 On approaches to watercourse crossings, the organic soil layer and lesser vegetation shall not be stripped from portions of the ROW not needed for the road grade.

11.4.7 Any in-stream activities shall be scheduled to avoid migration, spawning and incubation periods of migratory or resident fish species (restricted activity periods). Mitigative measures approved by Alberta may allow for deviations from the in-stream timing constraints.

11.4.8 Upstream fish passage for migratory or resident species must be maintained at all watercourse crossings on fish-bearing waterbodies.

11.4.9 The flow of the watercourse must be maintained at all times when carrying out in-stream activities, unless otherwise approved under the Water Act.

11.4.10 Measures must be implemented to minimize the duration and amount of disturbance of the bed and banks of the watercourse or waterbody. Where damage to the bed and banks of a watercourse occur, appropriate measures to restore the bed and banks must be undertaken.

11.4.11 During timber operations measures must be implemented to prevent the deposition of soil, logging debris or other deleterious substances and materials that are toxic, or an immediate threat to fish and other aquatic organisms into any watercourse. Any such substances or materials unavoidably deposited in a watercourse must be removed immediately and reported to Alberta.

11.4.12 Measures must be implemented to prevent the transfer of biota that are not indigenous to the environment at the watercourse-crossing site.

11.4.13 Stream crossings shall be kept free of accumulated debris. Culverts plugged with ice shall be reopened to prevent flooding during spring thaw.

11.4.14 Interim erosion control measures (e.g., silt fences, straw bales or matting, gravel check dams) must be implemented and maintained until permanent vegetation and erosion control measures are established where necessary.

11.4.15 Stream crossings that fail shall be reclaimed or replaced (if necessary) with more appropriate crossing structures as soon as possible.

11.4.16 Bridge abutments shall not constrict the normal stream channel. Where stream banks must be built up to construct a bridge abutment, soil shall be brought in and deposited from the end of the grade – no equipment shall enter the stream channel. Bridge spans must extend beyond stream banks and abutment walls.

11.4.17 The use of bridges is preferred on fish-bearing streams; however, steel culverts may be permitted where they will not restrict upstream passage of fish. (see table 4 for more information on watercourse crossings).

11.4.18 Culverts for all classes of streams must be designed, properly sized and installed to prevent erosion at both the inflow and outflow ends of the structure. Culverts shall be of sufficient length beyond the fill with the overburden properly backsloped and stabilized to prevent sediment from entering the watercourse, and the ends of the culvert open at all times. Any culvert that becomes a hanging culvert must be correctly re-installed as soon as possible. (see table 4)

11.4.19 Properly constructed logfills (see 11.4.21 below) on temporary roads may be used to cross ephemeral watercourses during dry periods, and to cross intermittent

watercourses (with developed channels) during frozen periods. As soon as the temporary road is abandoned, logfills shall be removed so that no soil is allowed into the water channel. Logfills installed during frozen periods shall be removed before the spring thaw. A bottom layer of logs may be left in place when removing the logfill to provide for summer crossing of ephemeral watercourses.

11.4.20 Crossing intermittent or ephemeral watercourses within harvest areas shall be avoided when possible. When the crossings are necessary, they shall be constructed at specified locations using appropriate watercourse crossing structures.

11.4.21 A properly constructed logfill has all of the following:

- **a) Enough logs to adequately fill an ephemeral draw or watercourse channel so that when the logs are removed there is little or no damage to the banks or channel bottom;**
- **b) Logs delimbed and bucked to at least 1.5 m longer than the grade fill at each end;**
- **c) Logs covered by a layer of suitable material that separates the soil from the logs, which shall permit total removal of the soil cap;**
- **d) Cables laid under logs to allow for easy removal, or other provisions for removal that do not disturb the banks or watercourse.**

11.4.22 In fish-bearing watercourses, any negative impacts on the stability and fish habitat values of stream banks must be minimized. Any damage to streambanks and the corrective measures taken by the company shall be reported to Alberta within 7 days of the occurrence.

11.4.23 A native timber bridge may be used on small permanent or intermittent streams or ephemeral draws, provided that all of these requirements are met:

- **a) Bridge abutments do not restrict stream channel;**
- **b) A brow log is installed on both sides of the bridge deck to prevent soil from entering the stream;**
- **c) No equipment enters the stream channel;**
- **d) Timber of suitable size and strength is available for construction;**
- **e) The span extends beyond stream bank and abutment walls;**
- **f) A separation layer is used between soil cap and timber;**
- **g) The soil cap and separation layer is removed as soon as harvest and hauling is complete;**
- **h) The remainder of the structure is removed as soon as harvest and hauling operations are completed unless a proposal to leave crossing structures in place after hauling is approved by Alberta and an acceptable monitoring program is in place.**

11.4.24 Snow-fills may be used on watercourses during frozen conditions, provided that all of the following requirements are met:

- **a) Sufficient clean snow exists to fill creek channel;**
- **b) Bank integrity is maintained;**
- **c) Any soil cap installed over the snow is removed prior to break-up;**
- **d) Measures are in place to prevent soil or other debris from entering stream channel or ice surface;**
- **e) Stream flows are not impeded.**

11.4.25 Ice bridges may be used during frozen conditions provided that all of the following requirements are met:

a) No capping material is used on the bridge;
b) Winter stream flows are not impeded;
c) Approaches of snow and ice constructed of sufficient thickness to protect the stream bank;
d) Appropriate ice thickness exists to bear necessary load requirements;
e) No alterations to streambed or bank are required;
f) They are not on that portion of the Athabasca River between the East boundary of Twp 60-Rge 17-W5 and the North boundary of Twp 64-Rge 3-W5.

11.4.26 Each operator shall establish a monitoring program accept able to Alberta, for their watercourse crossings. Documentation as to current condition, repair requirements, or removal dates of the crossing structures must be maintained and made available to Alberta upon request.

11.4.27 Watercourse crossings that are no longer required shall be reclaimed with the objective of minimizing any sediment from entering the watercourse. Their condition shall be monitored annually until they are satisfactorily stabilized meeting the following requirements.

a) Removing all watercourse crossing and drainage structures and reclaiming stream banks and approaches;
b) Cross-ditching approaches, rolling back topsoil (including slash and logging debris) and within one year re-vegetating 90% of erodible bared surfaces with vegetation capable of maintaining bank stability. (This may include the use of sedges and willow cuttings).

11.5 ACCESS CONTROL

PURPOSE

To manage existing and proposed surface access recognizing key resource values.

DISCUSSION

The impacts of roads on resource values may require mitigation through access control measures. Wildlife, sensitive areas (i.e., historical sites, soils), protection of road quality and safety are reasons for implementing access control. A number of strategies and tactics are available for controlling or restricting access.

Access control measures for long-term roads shall be identified through the submission and review of the phased planning process. For temporary roads, the CA or GDP, and FHP shall be the mechanisms used in identifying access control requirements.

The following list of access control methods identifies a number of options that may be implemented:

- Physical Barriers (e.g., gates; barricades, pilings, crossing removal)
- Road Condition (e.g., berms, ditches, road standard, selective grade removal, roll-back, no snow removal)
- Regulatory (e.g., sanctuaries, timing restrictions, signage)

GROUND RULES

11.5.1 Where access control has been identified as an objective in strategic land use plans, Alberta shall consult with the forest operator to determine an access control strategy. In the event that a strategic land use plan has not been developed, the FHP shall describe specific access control measures identified in the GDP or FMP (see section 3.4).

11.5.2 In designated areas, Alberta may direct forest operators to restrict road access during specified periods, implemented in accordance with Alberta policy. Restricted access issues shall be dealt with differently depending on whether the road is new access or is existing access. All closures of existing access must be submitted to the Minister or his authorized delegate for approval whereas new access shall have the terms defined in the approval of the disposition.

11.6 CAMPS AND FACILITIES

PURPOSE

To give guidance to forest operators so that the planning, construction, maintenance and reclamation of camps and miscellaneous facilities is done in a manner that minimizes negative impacts on the forest environment.

DISCUSSION

Camps and other facilities are often a necessary part of operations in remote areas. Forest operators require that such facilities operate in an efficient and cost-effective manner and are implemented without compromising the integrity of the environment.

GROUND RULES

11.6.1 Any facility or camp that shall be in place for more than twelve consecutive months requires an appropriate disposition or land use permit.

11.6.2 Forest operators requiring camps or other temporary facilities (less than twelve months) shall notify Alberta in writing of the locations prior to establishment. Provided that the locations are suitable, Alberta shall issue a temporary field authority or equivalent approving the identified locations.

11.6.3 Where feasible, forest operators shall utilize existing clearings for establishment of temporary camps and/or other facilities. Proposed camps, facilities or storage sites shall be located using the following guidelines:

a) Place sites in existing man-made non-forested openings (i.e., gravel and borrow pit openings);
b) Place sites out of visual and auditory range from mineral licks and key wildlife areas or use a default of one kilometre;
c) Safe camp locations are a priority. Therefore, an evaluation of all potential risks shall be conducted prior to selecting a final camp location;
d) Camps and fuel storage sites shall be identified in the annual fire control plan when proposed locations are known;
e) Camps shall be kept clean. Proper mechanisms for the disposal of hazardous and non-hazardous waste shall be implemented.

11.6.4 All garbage generated must be disposed of properly. Domestic garbage shall be hauled to a landfill or burned in a gas-fired incinerator. Non-combustible materials left after incineration shall be hauled to an approved landfill or collection station. All prohibited debris shall be hauled to an appropriate facility.

11.6.5 Temporary fuel storage sites shall not be located within 100 m of any flowing watercourse.

11.6.6 Fuel storage sites require secondary containment for tanks larger than 454 litres.

11.6.7 Permanent camps and facilities shall be reclaimed as per the disposition conditions. Temporary camps and facilities shall be decommissioned to best resemble the pre-construction site conditions and shall be done concurrent with operations.

11.6.8 Camp food and garbage storage shall minimize the potential for problems with wildlife. Recommend following the Bear Smart guidelines for specific mitigation

relating to bears. Problems with wildlife shall be dealt with in consultation with Alberta.

12.0 REPORTING

PURPOSE

To ensure that timber operation activities are reported to Alberta in order to maintain an accurate and current database across the Province.

DISCUSSION

Silviculture and harvest operations reporting and monitoring is necessary to ensure legislated requirements are met in all treatment areas. Ground rules governing operations reporting are required to ensure consistency among forest operators. The intent of activity reporting is to communicate that a given activity has occurred, where it occurred and when it occurred. This information shall also be used for annual and stewardship reports and shall be RFP validated as per Appendix 1 of Annex 4.

GROUND RULES

SILVICULTURE AND HARVEST ACTIVITY REPORTING

12.0.1 Forest operators who conduct silviculture work on their disposition shall report the details of all work completed in the previous year annually into ARIS no later than May 15. The required information is outlined in the ARIS Industry Operations Manual. Information shall be submitted in accordance with all requirements of the manual and associated policy directives.

12.0.2 Alberta may require additional reporting for forest management activities such as thinning, herbicide, pesticide spraying, or fertilization. Alberta shall consult with the company on the appropriate format of such reports. Reporting of herbicide projects are as per Alberta requirements.

12.0.3 Companies harvesting more than 30,000 m^3/yr shall have self-inspection agreements in place and shall carry out periodic inspections of active timber operations and report the information to Alberta in a format acceptable to Alberta. Reports based on the TM 59 form, of harvest status of individual harvest areas shall be submitted to Alberta once per month or at agreed to intervals. All variances to ground rules, structure retention, and understory protection, shall be included in the report. Additional reporting requirements to be added in December 05:

Appendix 1 - Role of Regulated Forestry Professionals[2] (RFP) in Forest Management

The Alberta Government is committed to sustainable management of forests on public land to provide benefits and opportunities for Albertans. Alberta relies on the professional integrity of RFPs to enhance the effectiveness of forest resource management planning, implementation and harvest activity, while recognizing the interdisciplinary nature of forest management planning.

Alberta requires a RFP to submit the components of forest management plans, annual operating plans and harvest activity reporting, as identified in this annex, for approval.

1.0 Validation by a RFP

RFPs shall validate their submitted work by one of the following methods:

i. Signing using their professional title and registration number, or
ii. Stamping and signing using the seal provided by a *College*, or
iii. Using other mechanisms approved by Alberta.

1.1 Significance of RFP Validation

RFP *validation* provides assurance to Alberta that work is *accurate* and has been prepared with *due diligence*. Government RFPs shall review *validated work* by conducting a reasonable assessment for accuracy and shall take appropriate *corrective actions* where *validated work* is not *accurate*.

The documentation required to demonstrate *due diligence* is viewed as a significant source for validating accuracy. Alberta will not accept inadequate documentation and may refer such occurrences to the Complaints Director of the appropriate *College*.

1.2 Approval of Validated Work

Alberta's approval does not transfer the accountability for the plan or its implementation from the Organization or the submitting RFP to Alberta or its staff. Government RFPs who review submissions are accountable for their reviews and any direction provided to the Organization. *Approval* of *validated work* shall be addressed as described below.

1.2.1 Appraisal

Work with far-reaching and significant potential effect if inaccurate (such as but not limited to timber supply analysis, GDP). *Validation* of this type of work demonstrates confidence the work is *accurate*; however, due to its potential significance, it is both necessary and important to examine the work carefully. Approval shall be granted after the work has been reviewed by appropriate RFPs to assess accuracy. The timeline for this shall be established by Alberta and will vary depending on the nature of the *validated work*. Those preparing work for appraisal are advised to communicate with the reviewing government RFPs regularly and effectively to minimize confusion over the standards expected of the work.

1.2.2 Acceptance

Work with a more limited potential effect (such as, but not limited to silviculture reports, operations inspections). The work is considered

[2] Refer to Alberta Definitions

approved on the date Alberta acknowledges receipt of the work. Alberta shall notify the organization by acknowledging receipt within 5 working days of submission. The notification date will be documented by Alberta as the start date for FHP approval. Alberta shall periodically check the work and supporting documentation to verify its accuracy.

2.0 Work Validated by a RFP

All entities that conduct timber harvesting or silvicultural activities on public land, except those harvesting less than 30,000 m^3 annually from public land, must validate the items described below (the list of work to be validated may be amended from time to time by Alberta to adapt to change).

2.1 Forest Management Plans

The entire *forest management plan* shall be approved through an appraisal and must be validated by the senior RFP responsible for its preparation.

The following components must be validated by the RFP most directly responsible for their preparation. A RFP validated checklist describing the extent of compliance with applicable standards for each component shall be included with each submission:

i. Yield projections and all associated data and analyses – for appraisal
ii. Vegetation inventory data – for appraisal
iii. Landbase description (analysis and report) – for appraisal
iv. Silviculture strategies (refer to Annex 1, standard 5.5 on managed assumptions)– for appraisal
v. Forecasting (timber supply analysis) – for appraisal
vi. Harvest planning (*spatial harvest sequence*) - for appraisal
vii. Monitoring reports - annual - for acceptance; stewardship – for appraisal

2.2 Annual Operating Plans[3]

The minimum *validation* requirements are as follows:

i. General Development Plan – for appraisal
ii. Compartment Assessments - for appraisal
iii. Final Harvest Plan – for acceptance
iv. Road Plan and Fire Control Plan – for acceptance
v. Reforestation Program – for acceptance[4]

2.3 Harvesting and Reforestation Activities

Accurate and timely submission of timber production and sales information is important and must be validated. The activities related to reporting timber production and sales must be approved by the senior RFP responsible for the submission.

The following components of timber production and sales must be validated by the RFP directly responsible for their preparation:

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[3] AOPs are approved subject to a review by Alberta. Where a compartment assessment has been completed the CA, FHP and AOP shall be appraised by Alberta.

[4] Where thinning plans, herbicide plans, and reforestation prescriptions vary from FMP silviculture strategies the silviculture program shall be appraised by Alberta.

i. Scaling populations (TM262) – for appraisal
ii. Timber production audits – for acceptance
iii. Letters of Understanding – for appraisal
iv. Statutory Declarations of production – for appraisal
v. Harvest tenure standings – for acceptance
vi. Timber production reporting – for appraisal
vii. Silviculture information - regeneration surveys, ARIS submissions and silviculture operations reports, regeneration strata balance/swap/trade summaries – for acceptance
viii. Field operations inspection reports – for acceptance
ix. Herbicide reports – for acceptance

[1] AOPs are approved subject to an appraisal by Alberta. Where a compartment assessment has been completed the CA, FHP and AOP shall be appraised by Alberta.
[1] Where thinning plans, herbicide plans, and reforestation prescriptions vary from FMP silviculture strategies the silviculture program shall be appraised by Alberta.

Appendix 2 - Debris Disposal Policy

Alberta Sustainable Resource Development Policy

July 2, 2004

BRANCH: WILDFIRE PREVENTION **SECTION:** WILDLAND FIRE ENGINEERING	**POLICY NO:**
TOPIC: DEBRIS MANAGEMENT STANDARDS FOR TIMBER HARVESTING OPERATIONS	

Legislation and Policy

1. **AUTHORITY:**

   - Alberta Sustainable Resource Development (SRD)

2. **PURPOSE:**

   - To provide standards for debris management in timber harvesting operations in compliance with the *Forest and Prairie Protection Act* (FPPA) and the *Forests Act*. Compliance will reduce the threat of wildfire to communities and other values within the Forest Protection Area.

3. **Policy:**

   - The FPPA defines disposal standards for debris created fro m timber harvesting operations. Timber and reforestation activities must comply with the FPPA and the *Forests Act*, and the standards will be enforced.

   - The *Debris Management Standards For Logging Operations Policy* is effective September 1, 2004 and may be revised based on the results of the FERIC debris management research project. In addition to the disposal of debris, this Policy also applies to debris retained for reforestation, wildlife habitat and biodiversity or other landscape management objectives.

Application and Implementation of the Standards

Within the FireSmart Community Zone (approximately 10 km radius from the community) debris management strategies, for any purpose, must not include the retention of any debris piles.

Beyond the FireSmart Community Zone, SRD may approve the retention of debris piles through the Annual Operating Plan (AOP). Approval may be given only if debris pile retention is required on the basis of biodiversity, wildlife, or reforestation objectives and if a balance between these objectives and forest protection objectives has been met.

Debris management strategies must be linked to landscape objectives and must not conflict with the FPPA. The loss of productive land base resulting from timber harvesting operations (i.e. debris piles, roads, landings) must not exceed the specifications outlined in applicable operating ground rules (as per the Timber Management Regulations of the *Forests Act*).

Wildlife Habitat and Biodiversity Debris Pile Standards

Debris piles that are retained in the harvest area outside the FireSmart Community Zone for wildlife habitat or landscape biodiversity objectives must adhere to the following specifications:

I. If the strategy involves random scattered piles throughout the harvest

area:

- Height of piles must not exceed 2 metres.
- Base diameter of piles must be no greater than 3 metres.
- Distance between piles must be no less than 25 metres.
- Distance from block edge must be no less than 25 metres.

II. If the strategy involves random scattered piles made up of chip residue from chipping operations throughout the harvest area:

- Height of piles must not exceed 2 metres.
- Base diameter of piles must be no greater than 3 metres.
- Distance between piles must be no less than 15 metres.
- Distance from block edge must be no less than 25 metres.

III. If the strategy involves piling of debris at roadside:

- Piles can only be left along roads scheduled for reclamation and abandonment following the completion of reforestation (ie. Scarification, Planting).
- Piles must not exceed a maximum of 2 metres in height, 3 metres in width, 12 metres in length and perpendicular to the road.
- A group of piles may consist of a maximum of 5 piles with a spacing of 6 metres of slash free area between each pile within the group.
- Pile groups must be separated by a 50 metre slash free spacing.

Reforestation Debris Standards

Debris piles or windrows created from reforestation operation must adhere to the following specifications:

I. If the strategy results in debris piles:

- Height of piles must not exceed 2 metres
- Base diameter of piles must be no greater than 3 metres.
- Distance between piles must be no less than 25 metres.
- Distance from block edge must be no less than 25 metres.

II. If the strategy results in windrows (large logs, humus and duff):

- Windrows must not exceed 2 metres in height.
- Windrows must not exceed 3 metres in width.
- Windrows must not exceed an average of 75 metres in length and must have slash free spacing of 8 metres.
- Distance from block edge must be no less than 25 metres.

Enforcement/Approval

The Public Lands and Forests Division will serve as the "one-window" for industry contact

and approval.

SRD will complete field inspections as required.

Debris piles to be disposed must be in conjunction with the terms of these standards and the two year timeline set out in the FPPA. SRD will issue an "order to reduce or remove a fire hazard" when debris piles have not been properly disposed of in accordance with this Policy and the AOP approved by the department.

Forest Industry may apply to SRD for a one-year extension where drought conditions have prevented them from completing the burning operations. The Manager of the respective Wildfire Management Area must approve the extension.

Where debris disposal by burning is the strategy, Industry must report all burning locations to SRD one month before the start of the fire season.

Review Process

Research will be carried out by FERIC to assess the wildfire threat associated with debris resulting from logging operations. If findings indicate that standards within this policy are not sufficient to support wildfire threat reduction, the standards and policy will be modified.

Contact: Hugh Boyd, Director
Wildfire Prevention Branch
(780) 427-7811

4. **CROSS REFERENCE:**

1. http://www.qp.gov.ab.ca/documents/regs/1972_310.cfm

DATE ISSUED:	APPROVED BY:

Appendix 3 - Directive for Weed Management.

2001-06

Directive No.

Subject	Weed Management in Forestry Operations
Purpose	**To implement effective weed management programs administered by holders of *Forests Act* dispositions engaged in forestry operations. This policy applies only to *Forests Act* dispositions.**
Policy	Section 60 of the *Public Lands Act* sets out a disposition holder's responsibility with respect to noxious and restricted weeds on dispositions issued under that Act. Similarly, Section 31 of the *Weed Control Act* requires that the occupant (or if the land is unoccupied, the owner) of land destroy all restricted weeds, control all noxious weeds and prevent the spread or scattering of nuisance weeds. The weed control duties on holders of dispositions issued pursuant to the *Public Lands Act* are reasonably clear and would apply to such dispositions that are issued in relation to forestry operations (e.g. camps, roads, processing sites and other associated land uses). It is, however, not entirely certain as to how the courts would interpret and apply the definition of "occupant" under the *Weed Control Act* in respect of timber dispositions issued under the *Forests Act.* In terms of forestry operations, the vast majority of weed management situations should fall under either the *Public Lands Act* or the *Weed Control Act.* This Directive attempts to address weed management, in a forest operations context, where neither of these two Acts apply. The Crown's goal is to address weed management issues on a landscape level, as opposed to on a disposition by disposition level. To accomplish this, a two step approach will be taken. Firstly, the disposition document and annual operating plans (AOP) will be used to describe the disposition holder's obligations with respect to weed management activities. Secondly, the Land and Forest Service (LFS) (and ideally, municipalities) will establish landscape level, co-operative weed management groups, with a mandate to developing a single management plan for all stakeholders involved. Invasive weeds can alter the ecosystem's natural processes and displace native, threatened, and endangered vegetation and habitat. For these reasons, forest companies are expected to assist in managing weeds in the forested area of Alberta.

Procedure

Amendment of Annual Operating Plans and Dispositions

In order to address situations that fall outside the requirements of either the *Public Lands Act* or the *Weed Control Act* all AOPs prepared and submitted for timber dispositions are to include the following condition. Additionally, this statement is to be incorporated into the disposition itself upon issuance or renewal.

> "{*Disposition holder*} shall, with respect to the land contained in this timber disposition, prevent the establishment of and control all noxious and restricted weeds to which the *Weed Control Act* applies, in a manner acceptable to the Minister."

The Minister will consider the *"Recommended Standards of Good Practice for Prevention"*, described in the **Guidelines** section to be the minimum level of performance for all disposition holders. Where a disposition holder or weed management group (as described below) prepares a plan outlining weed management, the commitments in that plan will become the standards to which the disposition holder or parties to the group will be expected to meet. This plan will be approved, where appropriate, by the Regional Director.

Co-operative Weed Management Groups

The LFS will establish co-operative weed management groups where willing participants are identified. The specific purpose of the groups will depend on the level of current involvement the individual participants have in weed management. Where participants are currently managing weeds, the purpose of the group may be to review individual existing weed management plans to identify opportunities for co-operative management. Where participants are not currently involved in weed management the purpose of the group may be to develop a single weed management plan for all group participants, or to assist individuals in the development of individual plans if desired.

The role and degree of involvement of LFS staff on these groups will depend on the make-up and desires of each individual group. Typically, the LFS will convene and co-ordinate weed management group meetings, in addition to other roles defined by the group. Forest Management Division staff will work with Forest Area staff to develop provincially consistent Terms of Reference for each group, and provide technical expertise and support where possible. Each group will select its own chairperson and define the roles for each member.

Weed management plans should address inventory, control, education, and prevention. Once a co-operative or individual weed management plan is agreed to, that plan will be implemented through the individual's AOP. The results of this implementation will be used as the benchmark to which the Minister's satisfaction for weed control and prevention is measured (i.e. vis-à-vis the AOP clause described above).

Guidelines

To assist in determining whether a disposition holder's weed management activities are acceptable to the Minister, the following guidelines describe the four essential aspects of weed management: goals, prevention, inventory and control. All of these should be considered when developing weed management activities and plans.

A. Goals

The goals should be specific to noxious and restricted weed prevention, inventory and control. They can be short-term and long-term, as is the nature of weed management.

B. Recommended Good Standards of Practice for Prevention

1. Limit Soil Disturbances

To limit the establishment of weed infestations, prevent unnecessary soil disturbances wherever possible.

2. Clean Equipment

Practice due diligence by ensuring that all equipment and vehicles are free of weed seeds and plant parts before arriving on a job site. All agricultural implements or any equipment knowingly exposed to weeds are to be pressure washed prior to use in forested areas.

3. The Use of Straw Bales for Erosion Control

The use of straw bales for erosion control is discouraged in the Green Area. Unlike hay, it is very difficult to determine if the straw bales are free of weed seeds. Therefore, certified "weed free" hay bales acquired from producers with a "Certificate of Inspection" should be used for erosion control.

4. Use Certified "Weed Free" Seed for Re-vegetation of Disturbed Sites

Canada #1 Seed, approved under the *Canada Seed Act, **may not be*** weed free. To ensure a seed mix is virtually weed free, a purchaser can request a "Certificate of Seed Analysis." To get a more detailed "Certificate of Seed Analysis", the purchaser can request a larger seed sample analyzed, rather than the typical 25g sample to improve the confidence of the analysis. Alternatively, one can start with pure seed and then prepare the seed mix manually.

5. Rapid Response to Weed Infestations

Because a single plant and small infestations are easier to control than large infestations, it is important to manage weeds proactively. To do this effectively, industry and LFS field staff should be trained in the identification of restricted and noxious weeds, and the importance of destroying individual weed plants and reporting new infestations.

C. Inventory

A weed management program is most effective with an accurate account of existing weed infestations. Inventorying is most effective during the months of June through September, when most plants are in bloom and are the most easily recognized. "Noxious" and "Restricted" weed species to be surveyed are listed in the *Weed Designation Regulation (138/80)*. Additionally, the *Weed Control Act* provides municipalities with the authority to designate other species of local concern as restricted or noxious. For this reason weed surveyors should obtain a list of restricted and noxious weeds

from the municipal district(s) within which they are surveying.

D. Prioritizing Areas for Control Measures

As some areas within which weeds are managed consist of a large land base, control throughout the entire area is not feasible. Specific areas should be targeted each year, based on priorities. When prioritizing areas for control treatments, many factors must be considered to deliver the most effective and efficient control program. The following example criteria are not ranked in order of importance, with exception of ***Restricted and Noxious***:

1. Restricted vs. Noxious

Target restricted weed infestations over noxious weed infestations. Control of restricted weeds should be implemented immediately following their discovery.

2. Location of Infestation

Target infestations in highly traveled areas over those in isolated areas, thereby limiting the threat of seeds or plant parts being Tran located.

3. Size of Infestation

Target small infestations before large ones, as it is easier to gain control of small infestations. This also applies to outlying pockets of larger infestations, which should be controlled prior to tackling the larger infestation. When dealing with a large infestation, a "contain and control" strategy (targeting outlying pockets, and/or the perimeter of the infestations) is an excellent option when resources are not available to control an entire infestation.

4. Weed Species

To prevent their establishment, target weed species that are less abundant on a regional basis. When controlling infestations, target the weed species with the greatest ecological impacts. In many situations this may be difficult to quantify, although generally speaking it can be done. For instance, a weed infestation encroaching on a habitat of an endangered plant species would have a higher priority than an infestation among common or non-native vegetation.

5. Co-operative Control Opportunities

Co-operative control is the most effective and efficient method to control weed infestations that span multiple dispositions or border of responsibility. Unless one is adopting a "contain and control" strategy, generally it is not a good idea to control only part of an infestation.

E. Control Options

When selecting a control method, it is important to note that different species respond differently to each method. The most efficient programs will have an integrated control plan that includes both prevention and one or more of the following control methods:

- **Mowing / Cutting** - Effective for perennial weeds. Careful monitoring and proper

timing are necessary for this to be a viable option. If a site is mowed over several years, well-developed root systems can eventually be depleted. Weeds should not be mowed once seed set has occurred, as this will aid in spreading seed.

- **Hand Pulling** - Effective for annual or biennial weeds, especially when dealing with small infestations or individual plants. Hand pulling may have to be done annually (before seed set) for several years, as dormant seeds in the soil may continue to germinate. If any weeds are pulled when in flower, they must be bagged and burned, as they will set seed if they are left on the ground.
- **Herbicide Application** - Very effective but will not guarantee 100% control. Sites may have to be revisited again the next year for follow-up treatments. Several herbicides are effective for each weed species. Chemical selection should be determined by site, weed species, existing desirable vegetation, and whether or not a residual effect is wanted. Assistance with selecting a herbicide and application rate can be obtained through a Municipal District, County Agricultural Fieldman, or Certified Pesticide Applicator.
- **Biological Control** - This method of control is the introduction of insects or diseases that attack or infect a specific weed species. Biological control agents can be difficult to obtain, and in some cases they are in the testing phase to determine effectiveness. Information regarding the biological control of weeds can be obtained through the Alberta Research Council in Vegreville, Alberta.

Authorities

Weed Control Act - provincial legislation describing weed control and management requirements.

Weed Designation Regulation - **lists weed species designated as restricted, noxious and nuisance in Alberta.**

Forests Act - **describes the requirements with respect to forest allocation.**

Cross-Reference

- **FPD Policy 16.0 - Restricted and Noxious Weed Management Jurisdiction**
- **Land and Forest Service "Forest Management Herbicide Reference Manual"**

Contacts

	Doug Sklar	422-4590
	Hideji Ono	422-8801

Approved

Appendix 1 - Role of Registered Forest Practitioner in Forest ManagementAlberta	The Department of Sustainable Resource Development, including the Public Lands and Forests Division, Fish and Wildlife Division, and Forest Protection Division or as amended from time to time.
Alberta Vegetation Inventory (AVI)	An inventory of vegetation and forest stands including non vegetated areas.
Analysis	A detailed examination of a body of data, a series of decisions, or the implications of one or more policies, and a determination of what this examination reveals about the nature, function and/or relationships in effect.
Annual allowable cut (AAC)	The volume of timber that can be harvested under sustained-yield management in any one year, as stipulated in the pertinent approved forest management plan. In Alberta it is the quadrant cut divided by the number of years in that quadrant, usually five.
Annual Operating Plan (AOP)	A plan prepared and submitted by the forest operator each year, which provides the authorization to harvest. An AOP is a requirement of the Timber Management Regulation. (See section B 1.4)
Approval	Issued by Alberta. Approval Decision is prepared outlining significant items considered in plan approval and outlining conditions to be met within specified time periods by the Organization or a decision made by Alberta on an AOP.
Approval Review Committee	Committee comprised of senior Alberta staff that provides recommendations to the Executive Director of Forest Management Branch regarding DFMPs.
Armillaria root rot	*Armillaria* spp.
A-spatial Proxy	A non-spatial representation of a forest management activity that has real elements of space and time.
Assumptions	A judgmental decision made by a planner or decision maker that supplies missing values, relationships, or societal preferences for some informational component necessary for making a decision
Atropellis canker	*Atropellis piniphila*
Audit	An official examination and verification of records, activities, accounts, actions, operations, etc., against stated standards of performance and compliance.
Bared soil	Any soil where the organic layers and vegetation have been removed.
Barriers to fire spread	Those biophysical landscape features that either do not burn, or at certain times of the fire season are "fire resistant." Some of the features that do not burn include water, rock, cultivated fields, improved roads (with a grade). (Stegehuis)
Biological diversity (biodiversity)	The variety, distribution and abundance of different plants, animals and microorganisms, the ecological functions and processes they perform, and the genetic diversity they contain at local, regional or landscape levels of analysis. Biodiversity has five principal components: (1) genetic diversity (the genetic complement of all living things); (2) taxonomic diversity (the variety of organisms); (3) ecosystem diversity (the three-dimensional structures on the earth's surface, including the organisms themselves); (4) functions or ecological services (what organisms and ecosystems do for each other, their immediate surroundings and for the ecosphere as a whole, i.e. processes and connectedness through time and space); and (5) the abiotic matrix within which the above exists, with each being interdependent on the continued existence of the other. [Dunster]
Borrow pit	A small quarry or excavation, which provides material for use in the construction project. [Revised from Dunster]
Buck	To cut a felled or downed tree into shorter lengths.
Buffer	Used in several contexts. 1 In protecting critical nesting habitat areas, the buffer is an area of forest land that reduces the impacts of adjacent activities on the critical area. The dangers associated with adjacent disturbances might include wind-throw or wind damage to nest trees and young birds in the nest, increased predation and loss of interior forest conditions. 2 A strip of land between two areas under different management regimes. Pesticide buffer zones are used to limit the possible drift, run-off or leachate of pesticide from a site into other areas, such as waterbodies or creeks. Streamside buffers are used to limit the effects of logging on creeks,

	such as siltation, loss of shading, loss of nutrient inputs from trees and degradation of riparian zones. The size and composition of the buffer zone depends on its intended function. 3 An area maintained around a sample or experimental plot to ensure that the latter is not affected by any treatment applied to the area beyond the buffer. 4 In GIS work, a new polygon computed on distance from a point, line or existing polygon. 5 In managing biosphere reserves, an area or edge of a protected area. Examples of compatible activities might include tourism, forestry, agroforestry, etc. The objective of the buffer zone is to provide added protection for the core reserve area. [Dunster]
Clearcutting	A regeneration system where all or most of the merchantable trees in a defined area are harvested in one cutting with reproduction obtained through artificial or natural means.
Coarse filter management	Conservation of land areas and representative habitats with the assumption that the needs of all associated species, communities, environments and ecological processes will be met. [Dunster]
College	The College of Alberta Professional Foresters (CAPF) or the College of Alberta Professional Forest Technologists (CAPFT).
Commercial Thinning	A partial cut where trees of a merchantable size and value are removed to provide an interim harvest while maintaining a high rate of growth on the remaining, well-spaced, final crop trees. Used to capture volume likely to succumb to competition pressures and be lost to disease, insect, or dieback.
Commercial timber permit (CTP)	A timber disposition issued under Section 22 of the Forests Act authorizing the permittee to harvest public timber.
Compaction	A transfer of wheel pressure to soils causing collapse of large air-filled pores, a type of disturbance when tire imprint is often invisible under the duff layer. Soil susceptibility to compaction is maximal when soil is at field capacity, which can be detected by stability of hand cast. Most of soil compaction occurs during the first passes of equipment because soil gains strength with each additional pass.
Compartment	A subsection of an FMA for which operational plans are developed.
Connectivity	A measure of how well different areas (patches or a landscape are connected by linkages, such as habitat patches, single or multiple corridors, or "stepping stones" of like vegetation. The extent to which conditions among late successional/climax forest areas provide habitat for breeding, feeding, dispersal and movement of late successional - or climax-dependent wildlife or fish species. Natural landscapes often tend to be better connected than those that have been heavily influenced and disturbed by human activities. Consequently, there is a body of opinion that the best way to avoid fragmentation of landscapes is to maintain, or re-establish, a network of landscape linkages. At a landscape level, the connectivity of ecosystem functions and processes is of equal importance to the connectivity of habitats. [Dunster]
Constraints	The restriction, limiting, or regulation of an activity, quality or state of being to a predetermined or prescribed course of action or inaction. Constraints can be a result of policies or political will; management direction, attitudes and perceptions; or budget, time personnel and data availability limitations; or, more typically, a complex interaction of all these factors. [Dunster]
Corrective Actions	May include one or more of the following: - Direct that the work be corrected and re-submitted; - Carry-out an appropriate enforcement response; - Refer the matter to the Complaints Director of the appropriate College to investigate the complaint.
Corridor	1 A physical linkage connecting two areas of habitat and differing from the habitat on either side. Corridors are used by organisms to move around without having to leave the preferred habitat. A linear habitat patch through which a species must travel to reach habitat more suitable for reproduction and other life sustaining needs. Many corridors, linking several patches of habitat, form a network of habitats. The functional effectiveness of corridors depends on the type of species, the type of movement, the strength of the edge effects and its shape. 2 An area of uniform width bordering both or one side of a lineal feature, such as a stream or route. [Dunster]
Cross-drainage structures	Culverts or other drainage structures that permit water to move from one side of a road to the other, normally under the road grade.

Culmination age	The age at which the stand, for the stated diameter limit and utilization standard, achieves its maximum average rate of volume production (the Mean Annual Increment, or MAI is maximized.
Deactivation	Taking a road out of active use through implementation of erosion control measures, road blocks and/or other methods.
Deciduous timber allocation (DTA)	A quota of deciduous timber.
Deleterious material	Section 34(1) of the Fisheries Act defines "deleterious substance" as: (a) any substance that, if added to water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water, or (b) any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water.
Desired Future Forest	A spatially explicit projected range of conditions of the forest landscape 100+ years into the future. The range of forest conditions defines the goal towards which forest management will be directed. It is our best guess today on the arrangement of forest age classes, roads and habitats that will provide for a set of objectives and desired outcomes that have been identified for the area.
Detailed forest management plan (DFMP)	A long-term plan used to outline higher-level management objectives, sustainability and timber production assumptions for a Forest Management Agreement (FMA).
Displaced soil	Mixed mineral, surface and sub-surface horizons that have been deposited off the road or disturbed surface to a depth of 15 cm or greater.
Disturbance patterns	The spatial and temporal arrangement of disturbances.
Ditch blocks	Barriers constructed across ditches to retard water flow, to redirect water from the ditch or to form a small catch basin.
Downed woody debris	Woody material >1cm in diameter, stumps and snags < 1.3 m tall and dead trees leaning >45 degrees. The woody material left on site after logging including both pre-existing and harvest-generated material (downed boles, limbs, tops and stumps). Includes highly decomposed and vegetated material as long as it is recognizable as woody.
Drought	Extended period of below average precipitation causing a lowering of the water table. Generally occurs over several years but locally may happen seasonally. Signs would be lowering of lake levels and drying of streams that would normally flow all year.
Due Diligence	**- taking and documenting steps to ensure that the desired outcome is achieved or that the chances of a negative consequence or outcome is minimized.** - ensuring completeness, correctness, consistency and repeatability. - demonstrating how conclusions were reached. - using mechanisms , such as but not limited to checklists and standard operating procedures, to demonstrate that appropriate procedures were followed and to ensure that no relevant steps or considerations were missed. - keeping and maintaining appropriate files and filing systems as well as document retention policies and practices.
Duff layer	The organic horizons of the soil profile (LFH). Commonly referred to as the forest floor.
Dwarf mistletoe	*Arceuthobium americanum Nutt.*
Ecological integrity	The quality of a natural, unmanaged or managed ecosystem in which the natural ecological processes are sustained, with genetic, species and ecosystem diversity assured for the future. [Dunster]
Embedded operators	Includes quota holders, permittees and other industrial operators with dispositions located within a Forest Management Agreement Area.
Enhanced Forest Management (EFM)	Enhanced forest management is defined as improvements in growth projections that result from thinning, fertilizing, tree improvement or drainage.

Environmental field report (EFR)	A document that must be submitted for most green area disposition applications as required under the Public Lands Act. The disposition applicant completes the EFR, which includes details on construction practices and environmental issues, and contains operating conditions that apply to the approved disposition. The EFR forms part of the approval for the Public Lands Act disposition.
Even-aged stands	A stand of trees in which the age differences among trees are small, usually less than 10 to 20 years, or 30% of the rotation age in stands more than 100 years old. Even-aged stands result from disturbances occurring at one point in time, such as wildfires, a clearcut, a seed tree cut, or a shelterwood cut or coppicing. [Dunster]
Features	The features represented on a map which describe the physical aspects of the harvest design. E.g. harvest area boundaries, roads, buffers, wildlife habitat.
Fire hazard evaluation	A conversion of forest inventory classifications to fire behaviour prediction fuel typing (AVI2FBP), crown fire threshold modeling (CROSUM) and determination of head fire intensity percentiles (spring, summer and fall).
Fire risk occurrence	Location of person-caused and lightning fires in relation to the fire hazard evaluation. It is used to represent "fire danger" in a spatial context.
FireSmart Community Zone	A standard 10 kilometre radius around the community extending from the Wildland Urban Interface Zone. A unique data set will be gathered for this zone for commu nity protection planning to provide a fundamental linkage between FireSmart Communities and FireSmart Landscapes
FireSmart Landscape Zone	This zone extends beyond the FireSmart Community Zone overlapping multiple jurisdictions at a broad landscape level. This zone focuses on mitigating the likelihood of large, high intensity, high severity fires. Fire, Forest and Land Management planning are integrated and designed to reduce the negative ecological, economic and social impacts of wildfire while maximizing the positive attributes of wildfire.
FireSmart Landscapes	The philosophy that seeks to mitigate the likelihood of large, high intensity and high severity fires. FireSmart landscapes are designed to recognize the interaction between ecological, economic and social impacts, hence maximize the positive ecological impacts and minimize the negative economic and social impacts.
Floodplains	Flat land bordering a stream or river onto which a flood will spread. The underlying materials are typically unconsolidated and derived from past stream transportation activity. The extent of the floodplain varies according to the volume of water, and its 50-year-old floodplain would be defined by the largest flood that would, on average, occur once within a 50-year-period, estimated from historic stream flow records. [Dunster]
Forest Area Manager	The senior Alberta manager located at a Forest Area charged with supervision of all forest management activities in a Forest Area. It may also mean someone else who is authorized to approve an AOP.
Forest Health	A condition of the forest; a forest is considered healthy if it can sustain itself to meet the specific forest land management objectives of today or in the future.
Forest Management Agreement (FMA)	A contract between the province of Alberta and the FMA holder whereby the province provides an area-based Crown timber supply. In return, the FMA holder commits to the following: Managing the timber resource on a perpetual sustained yield basis, taking into consideration a broad range of forest values in determining forest management practices. Meeting defined economic objectives, including capital investment and job creation, and seeking out new business opportunities that provide measurable economic benefits for both the province and the FMA holder. The FMA gives the FMA holder the right to access Crown fibre. In return, the FMA holder commits to forest management responsibilities, which may change from time to time.
Forest Management Plan	Generic term for Preliminary Forest Management Plans, Detailed Forest Management Plans, Forest Management Unit Plans, General Development Plans, Annual Operating Plans.
Forest Management Unit (FMU)	An administrative unit of forest land designated by the Minister, as authorized under Section 14(1) of the *Forests Act*.
Forest officer	An employee of Alberta appointed in accordance with the Public Service Act who represents the Minister in the administration of the Forests Act, the Timber Management Regulation, the Public Lands Act, and the Forest and Prairie Protection Act and Regulations on public forested

	lands.
Forest operations	Includes all activities related to timber harvesting, including site assessments, planning, road construction, harvesting, reclamation and reforestation.
Forest operator	The timber disposition holder or person responsible for controlling harvest planning and operations in the timber disposition. It also refers to those persons working on behalf of the disposition holder while conducting forest operations.
Forest tent caterpillar	*Malacosoma disstria*
Forests Act, the	The legislative statute that authorizes the Minister to administer and manage the forested lands of Alberta.
Full Review	An evaluation of the acceptability for approval of a submitted document involving referrals to government departments, independent experts, or others as appropriate, and a risk analysis prior to Alberta granting approval to the submitting Organization.
Genetic Diversity	The genetic variability within a population or a species; the number and relative abundance of alleles. Genetic diversity can be assessed at three levels: Diversity within breeding populations, Diversity between breeding populations within any one geographic area, Diversity within the species
Grazing disposition	An authorization issued by Alberta for the purpose of domestic livestock grazing on public land (i.e., lease, license or permit).
Green-up period	The time needed to re-establish vegetation after a disturbance. Specific green-up periods may be established to satisfy visual objectives or hydrological requirements, or as a means of ensuring re-establishment of vegetation (for silviculture, wildlife habitat or hydrological reasons) before adjacent stands can be harvested.
Ground Rules	Standards for operational planning and field practices that must be measurable and auditable and based forest management plan objectives.
Growing Stock	The sum (by number, basal area or volume) of trees in a forest or a specified part of it.
Guideline	A preferred or advisable course of action respecting land and resource management. Guidelines imply a degree of flexibility, based on administrative judgment or feasibility of applying the guideline, and are consequently not normally enforceable through legal means.
Harvest area	A specified land area with defined boundaries where timber harvesting is scheduled, or has occurred. (commonly referred to as a cut block)
Harvest area form	A map and harvest area comments for each laid-out harvest area.
Hiding cover	See "*sight distance.*"
High-water mark	Stream course water levels corresponding to the top of the unvegetated channel or lakeshore.
Historical resource	Any work of nature or man that is primarily of value for its palaeontological, archaeological, prehistoric, historic, cultural, natural, scientific or aesthetic interest, including, but not limited to, the structure or object and its surrounding site.
Interpretive Bulletin	Document issued from time to time by Alberta describing protocols, standards, methods or other applicable to forest management planning.
Harvest area aesthetics	Overall quality of operations in respect to the real or imagined effect on visual quality and/or the environment within a particular harvest area.
Harvest Level	A volume or area of timber determined through timber supply analysis available for harvest on an annual sustainable basis within a DFA. A harvest level is not an AAC unless approved by the Minister.
Inoperable	Classification of a forest site based on the potential to harvest timber on that site, as affected by physiographic characteristics, moisture regime and harvesting equipment/technology.
Insects and Diseases	Biological, physiological, and environmental agents that have an adverse effect on the health of the forest. These agents include insects; nematodes; micro-organisms (viruses, bacteria, fungi); parasitic plants; mammals; birds; and non-infectious disorders caused by climate, soil, applied chemicals, air pollutants and other physiographic conditions.
Integrated resource management (IRM)	IRM is an interdisciplinary and comprehensive approach to decision making for the management of natural resources. IRM integrates decisions, legislation, policies, programs and activities across sectors to gain the best overall long-term benefits for society and to minimize conflicts. This approach recognizes that the use of a resource for one purpose can affect both the use of a resource for other purposes and the management and use of other resources. IRM is

	based on: Co-operation, communication, co-ordination and the comprehensive consideration of all resource values. This philosophy is centered on the belief that efforts to manage natural resources will be more successful if they are co-ordinated at all levels within government; and Appropriate consultation before action. Those who are significantly affected by a decision should have the opportunity to participate in the decision making process.
Integrated resource plan	A regional plan developed by provincial government agencies in consultation with the public and local government bodies. It provides strategic policy direction for the use of public land and its resources within the prescribed planning area. It is used as a guide for resource planners, industry and publics with responsibilities or interests in the area.
Interests	The wants, needs, concerns and desires of each party that provide motivation to be concerned about an issue or topic.
Interior forest conditions	The environmental conditions typical of the central or interior part of a habitat patch. They are usually relatively stable and are not influenced by the changing climatic conditions and other variables (noise, wind, sunlight, temperature, moisture) associated with edge conditions. [Dunster]
Issue	The topic to be discussed. The problem to be solved. The theme of the discussion.
Jack pine budworm	*Choristoneura pinus*
Landing	Any area where logs are gathered for processing or further transport to a mill site.
Landscape	A landscape (or LMU) is a heterogeneous area in which the pattern of the mosaic of local ecosystems or land uses is repeated in similar form throughout kilometres wide area (after Forman 1986). Landscapes may coincide with a climatic, physiographic or ecological boundary. However, landscapes are not strictly ecologically based and include human use and modification of the area.
Landscape fire assessment	Information on the effects of fire which may be used to influence forest management strategies and tactics over a landscape. The wildfire threat component of the landscape fire assessment handles the negative aspects of fire, and fire regime analysis handles the positive attributes. Both "wildfire threat" and "fire regime" need to be considered in order to provide a balanced "landscape fire assessment." [Stegehuis]
Large patch of residual trees	A 0.2 to 2 ha patch of undisturbed canopy forest surrounded by harvested area. At least half of the trees in the patch should be large residual trees.
Large residual tree	A residual tree with a diameter measured at breast height (DBH) greater than the approximate average merchantable tree DBH of the harvest area.
Letter(s) of Understanding	An agreement(s) signed between the Organization and the Crown outlining commitments and timelines for each party on future timber production audits as referenced in the "Timber Audit Framework."
License of occupation (LOC)	A disposition issued by Alberta authorizing occupation of a linear corridor, often for an access road.
Logfill	Stream crossings constructed with logs placed in a streambed parallel to the flow of the water.
Logging slash	The unusable trees, shrubs or portions thereof that result after tree felling, skidding and processing at the harvest site.
Machine-free zone	The area protected from machinery which would cause soil damage.
Mass-wasting	Movement of large masses of land, soil or regolith (i.e., slumping, landslides, rock slides and massive undercut erosion).
Mature stands	Stands that have reached rotation age or have a decreasing growth rate.
Mean Annual Increment	The average annual increase in volume of individual trees or stands up to the specified point in time. The MAI changes with different growth phases in a tree's life, being highest in the middle years and then slowly decreasing with age. The point at which the MAI peaks is commonly used to identify the biological maturity of the stand and its readiness for harvesting.
Maximum Mean Annual Increment	The volume available at the culmination of mean annual increment. The volume/ha described by the point on a volume/ha:age graph where the curve of mean annual increment crosses the curve of the current annual increment (CAI).
Mixedwood forest	A forest type in which the softwood component is between 20% and 80% by crown closure.
Model	An idealized representation of reality developed to describe, analyse or understand the behaviour of some aspect of this reality. A mathematical representation of relationships under

	study. The quest to find a subset of variables and a function between them that predicts one or more dependent variables.
Mountain pine beetle	*Dendroctonus ponderosae*
Noxious Weed	A plant designated under the Weed Regulation (AR 171/2001) of the Weed Control Act.
Organization	The proponent charged with developing the FMP. This may be a corporation, cooperative, or a public agency.
Partial cutting	A treatment where significantly less than 100% of the trees are harvested from a stand or area. It includes commercial thinning, even when the intention is leading to a final clearcut.
Pattern	The arrangement of forest stands or harvest units.
Permanent reserve	An area permanently excluded from harvesting in the DFMP.
Permanent roads	Roads that will be in use for more than five years.
Permanent sample plots (PSP)	A fixed or variable area plot established for (forest) sampling and measurement purposes, and designed for remeasurement.
Phase III forest inventory	A provincial forest inventory of the forested lands of Alberta.
Planning Horizon	The length of time over which a series of defined management actions occur. For the purposes of modeling, usually equivalent to two full rotations.
Precautionary AAC	A level of harvest set that minimizes the risk of negatively impacting forest resources from an inadequately justified management assumption or in the absence of a comprehensive DFMP for the DFA.
Pre-commercial Thinning	A silvicultural treatment to reduce tree density in young stands, carried out before the stems reach merchantable size. The intent is to concentrate the site's growth potential on fewer trees thereby accelerating stand development and reducing the time to final harvest, retaining more live crown, creating opportunities for future commercial thinning activities and improving stand operability.
Preliminary Forest Management Plan	A plan submitted by FMA holders within 12 months of signing a new agreement (includes a major revision to an existing agreement). It establishes an interim harvest level and cut sequence complete with justifications. This plan is the basis for harvest authorization until replaced by the Detailed Forest Management Plan.
Prescribed burn	The planned use of carefully controlled fire to accomplish predetermined management goals (e.g., site preparation for planting, reduction of fire hazards or pest problems, improvement of the ease with which the site can be traversed, and creation of better quality browse for wildlife). [Dunster]
Prohibited debris	Any flammable debris or waste material that, when burned, may result in the release of dense smoke, offensive odours or toxic air contaminants. It includes: (a) Garbage or refuse from commercial or industrial operations (b) Rubber or plastic, or anything containing or coated with rubber or plastic or similar substances (c) Used oil from internal combustion engines, hydraulic oil and lubricants (d) Motor vehicle tires.
Quadratic Diameter	The diameter of the tree with average basal area for a given stand.
Quota	The timber quota is a share of the allowable cut of coniferous timber within a forest management unit.
Reclamation of roads	Permanent removal of watercourse crossings; re-contouring of road crown and ditches; reseeding or planting of the former right-of-way.
Recreationalist	A person who participates in outdoor activities in the forest, such as horseback riding, ATV riding, snowmobiling, hiking, cross-country skiing, wilderness area experience, hunting, fishing, berry-picking, wildlife viewing, photography, camping, canoeing, etc.
Recreation Site	Includes areas designated by Alberta as Ecological Reserves, Wilderness Areas, Wildland Parks, Provincial Parks, Heritage Rangelands, Natural Areas, and Recreation areas.
Regeneration	The renewal of a tree crop by natural or artificial means. It may also refer to the young crop itself.
Regulated Forestry Professional	A Registered Professional Forester (RPF) on the Registered Professional Forester Register of the College of Alberta Professional Foresters (CAPF) or a Registered Professional Forest Technologist (RFPT) on the Registered Professional Forest Technologist Register of the College of Alberta Professional Forest Technologists (CAPFT).

Reserve	In its strictest sense, an area of land designated as being off-limits to any exploitive activities that might change the nature of the area. Not all reserves are so tightly controlled. [Dunster]
Residual structure	Standing structure that is taller than 2 m, within a harvested area. Areas buffered for sensitive ecological or wildlife habitat may be included for residuals. Required buffers for lakes and small and large permanent streams are not included. This includes non-merchantable trees and shrubs, live merchantable trees, snags and stubs.
Residual tree	A live canopy tree that is spatially within a harvested area. Areas buffered for sensitive ecological or wildlife habitat may be included for residuals. Required buffers for lakes, small and large permanent streams are not included.
Resources	Physical and intrinsic features of the land, including but not limited to timber, wildlife, water and soil.
Restricted Weed	A plant designated under the Weed Regulation (AR 171/2001) of the Weed Control Act.
Review	Acceptance or appraisal conducted by Alberta
Review Team	A group of senior Alberta officials and the Forest Management Planning Forester formed to review detailed forest management plans.
Right-of-way (ROW)	A cleared area, usually linear, containing a road and its associated features such as shoulders, ditches, cut and fill slopes, or the area cleared for the passage of utility corridors containing power lines or over- or under-ground pipelines. Typically, the right-of-way is a specially designated area of land having very specific rights of usage attached. Rights-of-way may be owned by someone else. [Dunster]
Riparian area or management zone	(1) The band of land that has a significant influence on a stream ecosystem or is significantly affected by the stream. It often has specialized plant and animal communities associated with it. [Anon] (2)Terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables and soils that exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs and wet meadows. The riparian zone is influenced by, and exerts an influence on, the associated aquatic ecosystem. [Dunster]
Root collar weevils	*Hylobius* spp.
Rotation	The period of years required to establish and grow even-aged timber crops to a specified condition of maturity.
Ruts	Machine depressions in the soil which are determined by depth and length: where the depth of the organic dark humus material is greater than 30 cm, a rut is a depression that shears the organic layer of soil (a sheared organic will expose a vertical face greater than 20 cm of the organic layer). Where the depth of the organic material is less than 30 cm, a rut is a depression exceeding 10 cm into the mineral soil. Length: An impacted area meeting the rut depth criteria that is greater than 4 m long. A continuous track with a rut less than 4 m because of stumps, logs or rocks lifting the vehicle will still count as a rut if the total length of the smaller holes is greater than 4 m.
Rutting/ puddling	A paste-like behaviour of wet soil when most of the soil pores are filled with water and soil literally flows from underneath the wheel to the sides and upward forming visible tire imprint into the mineral soil. Intensity/depth of rutting is directly related to the number of equipment passes. Soil is considered susceptible to rutting when it forms a stable hand cast.
Selection Harvesting	A silvicultural system used to create or maintain uneven aged stands. Usually accomplished through the periodic removal of groups of trees or individual trees, while full residual stand growth rates are maintained and natural regeneration from overstory trees is encouraged. Not to be confused with selective harvesting, or high-grading, where trees are selected and removed periodically based solely on economic criteria. Selective harvest is not designed to improve the growing conditions of the remaining crop trees as Selection harvest is.
Sensitive or Complex sites	Sites that have soil, water, slope, aesthetic, vegetation or wildlife characteristics that require special protection beyond the normal precautions described in the ground rules. They may be complex if many values or issues are involved.
Sensitive soil site	Any site that may be prone to soil movement, soil erosion, mass wasting or siltation due to

	steep slopes, wet ground, seepage areas, springs, fine textured soils or soils prone to mass wasting.
Sensitivity Analysis	An analytical procedure in which the value of one or more parameters is varied; the changes that this produces are analysed in a series of iterative evaluations. If a small change in a parameter results in a proportionately larger change in the results, the results are said to be sensitive to the parameter.
Seral stages	A stage in succession. A series of plant community conditions that develop during ecological succession from a major disturbance to the climax stage. Most common characteristics/classifications include tree species and age.
Sight distance	The distance at which 90% or more of an adult big game animal is hidden from the view of a human. This distance may vary from one stand to another.
Silt fence	Permeable fabric barriers installed along the contour to filter surface water runoff and trap sediment from sheet or overland flow and prevent it from entering streams.
Silvicultural systems	Systems that follow accepted silvicultural principles, whereby the tree crops are tended, harvested and replaced to produce a crop of a desired form. This includes even-aged (i.e., clearcutting, shelterwood or seed tree cutting) or uneven-aged (i.e., selection cutting) systems. A planned program of silviculture treatments over the life of a stand, it includes the harvesting and the follow-up tending to the next rotation. [Smith, 1996]
Silvicultural Transitions	Stand type or cover type changes resulting from planned silvicultural practices on the DFA in natural and managed stands (i.e. natural to managed, managed to managed). Changes relate to species and species mixes, densities and growth trajectories from basic or enhanced management.
Silviculture	The theory and practice of controlling the establishment, composition, health, structure and growth of forests in order to achieve specified management objectives.
Site preparation	Any action taken in conjunction with a reforestation effort (natural or artificial) to create an environment favourable for survival of suitable trees during the first growing season. Altering the ground cover, soil or microsite conditions can create this environment; using biological, mechanical or manual clearing; prescribed burns; herbicides or a combination of methods. [Dunster]
Skid trail	An unimproved temporary forest trail suitable for use by equipment such as bulldozers and skidders in bringing trees or logs to a landing or road.
Slenderness Coefficient	The ratio of height to diameter at breast height. Used to estimate windthrow and breakage potential of a stand.
Small patch of residual trees	A patch of less than 0.2 ha of undisturbed canopy forest surrounded by harvested area. The patch must be composed of at least four canopy trees. At least two of the trees in the patch should be large residual trees.
Snag	A dead tree that is taller than 2 m.
Soil Displacement	A loss of nutrient-rich organic layers, and top mineral soil as a result of harvesting activities. Bare mineral soil is susceptible to raindrop impact causing soil crusting, increased surface runoff, and erosion.
Soil disturbance	In the context of the 5% maximum allowable area within a harvest area, includes bared landing areas, temporary roads, displaced soils or ruts.
Soil productivity	The capacity of a soil to provide for growth.
Spacing Factor	Inter-tree distance expressed as a percentage of the stand's top height.
Spatial	Of, or existing in, space. [Webster's]
Species at risk	Any species known to be "at risk" after formal detailed status assessment and designation as "Endangered" or "Threatened" in Alberta. The list of species is maintained by Alberta.
Species of management concern	Species within the forest management planning area that have an identified value (social, economic, ecological) and are managed to ensure their continued protection and/or use. This includes species that are hunted or trapped, as well as those that are endangered or threatened.
Spruce beetle	*Dendroctonus rufipennis*
Stand	A community of trees sufficiently uniform in species, age, arrangement or condition as to be distinguishable as a group in the forest or other growth in the area. A stand may also be that polygon as defined in the AVI or Phase III inventory.
Stand Density	A stand model based on data from the –3/2 power law for self-thinning. Illustrates the

Management Diagram (SDMD)	relationships between diameter and height with stand density over time.
Strippings	Layers of humus-bearing topsoil and fine woody material above mineral soil that have been stripped off during road or landing construction.
Stub	A large residual tree that has been "topped off" at approximately 6 m to create an artificial snag.
Subgrade	The road base.
Subsequent pass	Any harvest occurring after the first harvest pass.
Suppression capability	The effectiveness of traditional fire suppression tactics. It is an objective evaluation of initial attack response time, access for ground support resources, water availability and terrain which might adversely impact movement of resources.
Sustainable forest management (SMF)	Management to maintain and enhance the long-term health of forest ecosystems, while providing ecological, economic, social and cultural opportunities for the benefit of present and future generations.
Temporal	Of, or limited by, time. [Webster's]
Temporary field authority (TFA)	An authority issued under Section 19 of the Public Lands Act by an Alberta officer to grant short-term land use activities on public land in the White or Green Areas. The TFA may or may not be related to an existing disposition that has also been issued under the Public Lands Act. The concept is to provide field-level service to an applicant, with access to public land for a specific purpose/use/activity, for a term of less than or equal to one year.
Temporary road	Roads that are part of a harvest area or that connect harvest areas, and are built, used and reclaimed before expiry of the Annual Operating Plan (AOP) or reclaimed within five years of construction.
Thermal cover	Generally, an area of at least 10 ha having a coniferous canopy at least 10 m in height, with at least 70% crown closure and a minimum width of 200 m. This cover is used by animals to assist in their temperature regulation during extreme weather conditions.
Three-pass harvest	A harvest pattern in which all the available merchantable timber in an area is harvested in three separate passes. Normally it is done over approximately equal areas and in equal volumes.
Timber disposition	Licenses and permits that allow forest operators to harvest from Crown lands.
Timber Management Regulation	The legislative statute that describes the mechanism and regulations by which the forested lands of Alberta are managed. The Regulation is associated with the Forests Act.
Timber Operations	Includes all activities related to timber harvesting including site assessments, planning, road construction, harvesting, reclamation and reforestation.
Timber supply analysis (TSA)	Calculations/computer models with built-in assumptions regarding forest growth patterns, used to determine the annual allowable cut (AAC).
Timing constraints	A restriction or limitation on when an activity may be carried out.
Tolerance Limits	Acceptable degree of change that can be allowed before corrective action is taken.
Trapper	Holder of a trapping license.
Two-pass harvest	A harvest pattern in which all the merchantable timber in an area is harvested in two harvest passes. Normally, the harvest is done over approximately equal areas and in equal volumes.
Understorey	The trees and other woody species growing under the canopies of larger adjacent trees and other woody growth. [Dunster]
Uneven-aged stand	Stands in which the trees differ markedly in age, usually with a span greater than 20 years.
Unstable slope	Slopes of loose or poorly consolidated materials beyond the angle of repose, geological features having a high probability of failure, or soils that will not support loads.
Utilization	The portion of the stand or individual tree used for manufacture of wood products, defined in terms of piece length and diameter at each end. Minimum standards for utilization are defined in the timber disposition.
Validated work (Validation)	Work that has been prepared by, or reviewed and approved by an RFP. These professionals are subject to an enforceable code of ethics and standards of practice and are expected to complete their work with due diligence to ensure such work is accurate. The RFPs who validate the work may have done the work themselves, contracted the work to be done, or supervised those who did the work, but in any case, the validating RFPs are accountable for the work being prepared with due diligence and being accurate. If more than one RFP is involved in preparing the work, the RFP that is most directly involved in the work is to validate the work.

Values at risk	A listing of values which may be at risk of being reduced by wildfire. In order to complete a spatial "priority" evaluation, information regarding values is required.
Variance	Any deletion to a stand scheduled in the spatial harvest sequence. Additions to stands identified in the spatial harvest sequence are not considered variance but are tracked in section 3.4.1 of the ground rules.
Viable understorey	Trees of desirable merchantable species that are windfirm and of sufficient vigour that they will continue to grow after harvest.
Viewshed	The visible area, as it appears from one or more viewpoints.
Visual impact analysis (VIA)	Estimates visual impact potential, determines acceptable design and layout, and guides measures to be taken during and upon completion of operations to reduce visual contrast.
Visual quality objectives (VQO)	Broad objectives for visual resource management that set limits considered acceptable to the average viewer, as to the form and scale of visible alteration.
Visual resource assessment (VRA)	A relatively intensive reconnaissance of a landscape or parts of a landscape. A forest management planning framework for assessing Alberta's visual resource base in a consistent and systematic manner. Consists of four planning phases: visual resource inventory, visual quality objectives, visual impact analysis and total resource design.
Visual resource inventory (VRI)	A quick and simple process of recording the expanses of viewable area, noting key features, their prominence and sensitivity in order to better direct proposed harvesting operations in scenic or visually important areas.
Visual Resource Management	A standardized process of identifying and assessing visual values to ensure that proposed industrial developments in visually sensitive areas of Alberta, are planned and developed in a consistent manner. The process used is called a Visual Resource Assessment.
Water availability	Availability of water which can be utilized for fire suppression.
Water regime	Timing of water flow.
Water source area	That portion of a watershed where soils are water-saturated and/or surface flow occurs and contributes directly to streamflow. The area of saturated interflow associated with a stream.
Watercourse	The bed, bank or shore of a river, stream, creek or lake or other natural body of water, whether it contains or conveys water continuously or intermittently.
Watershed	An area of land, which may or may not be under forest cover, that drains water, organic matter, dissolved nutrients and sediments into a lake or stream. The topographic boundary, usually a height of land, that marks the dividing line from which surface streams flow in two different directions. [Dunster]
Western gall rust	*Endocronartium harknesii*
Wildland Urban Interface Zone	The area where various structures and other human developments meet or are intermingled with the forest and other vegetative fuel types.
Wildlife	Any species of amphibian, bird, fish, mammal and reptile found in the wild, living unrestrained or free roaming and not domesticated. Some definitions include plants, fungi, algae and bacteria. [Dunster]
Wildlife corridor	A strip of forest with a minimum width of 100m that connects two forested areas.
Wildlife zone	As defined on Fish and Wildlife Referral Maps.
Windfirm boundaries	Harvest area boundaries established at locations that are stable and that minimize the potential for timber losses from wind.
Yield Curve	Graphical representation of a yield table.
Yield Table	A summary table showing, for stands (usually even aged) of one or more species on different sites, characteristics at different ages of the stand.
Zone of Imminent Competition Mortality (ZICM)	The density at which mortality occurs due to intra-specific competition.

List of Initialisms

AAC	Annual Allowable Cut
AOP	Annual Operating Plan
ARC	Approval Review Committee
BOR	Basic Operating Rules
CAPF	College of Alberta Professional Foresters

CAPFT	College of Alberta Professional Forest Technologists
CCFM	Canadian Council of Forest Ministers
CT	Commercial Thinning
COP	Codes of Practice (Watercourse Crossings Codes of Practice, Water Act).
CSA	Canadian Standards Association
C&I	Criteria and Indicators
DHAP	Detailed Harvest Area Plan
DFMP	Detailed Forest Management Plan
EFM	Enhanced Forest Management
FLUZ	Forest Land Use Zone
FMA	Forest Management Agreement
FMP	See definitions - Forest Management Plans (generic)
FMU	Forest Management Unit
G&Y	Growth and Yield
GDP	General Development Plan
IRM	Integrated Resource Management
IRP	Integrated Resource Management Plan
MAI_{Max}	Maximum Mean Annual Increment
PCT	Pre-commercial Thinning
PDT	Plan Development Team
PFMP	Preliminary Forest Management Plan
PPG	Public Participation Group
RFP	Regulated Forestry Professional
RPF	Registered Professional Forester
RPFT	Registered Professional Forest Technologist
SFM	Sustainable Forest Management
SYU	Sustained Yield Unit
ToR	Terms of Reference
TMR	Timber Management Regulation made under the Forests Act
VOIT	Values, Objectives, Indicators and Targets